DOCUMENT RESUME

ED 175 443 IR 007 610

AUTHOR Ivy, S. C.: And Others
TITLE Statewide Considerations in Illinois 911 System Development. Final Report.
INSTITUTION Illinois State Commerce Commission, Springfield.
SPONS AGENCY Illinois State Law Enforcement Commission, Springfield.
PUB DATE Jun 76
NOTE 117p.: Appendix B and Figure 2 will not reproduce well because of small type size and some broken type
AVAILABLE FROM Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock Number 027-000-00773-2)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Emergency Programs; Fire Protection; Safety; *Statewide Planning; *Systems Building; *Systems Development; *Telecommunication; Telephone Communications Industry
IDENTIFIERS *911 System

ABSTRACT

This study conducted by the Stanford Research Institute under the direction of the Illinois Commerce Commission synthesizes plans, programs, and strategies to facilitate the implementation of statewide systems providing citizens with the single emergency telephone number 911, as directed by Illinois House Bill No. 911 PA 79-1092. The current situation in Illinois and national 911 systems development are discussed, as well as local perceptions of the 911 system and local requirements for the system; telephone and public safety situations; financing the 911 system; management of the system, including the most appropriate form for a given locality; the role of the Illinois Commerce Commission in the development, implementation, and evaluation of the 911 system; problem areas that impact on 911 development; and a program for the implementation of 911. (Author/RAO)

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Final Report

June 1976

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STATEWIDE CONSIDERATIONS IN ILLINOIS 911 SYSTEM DEVELOPMENT

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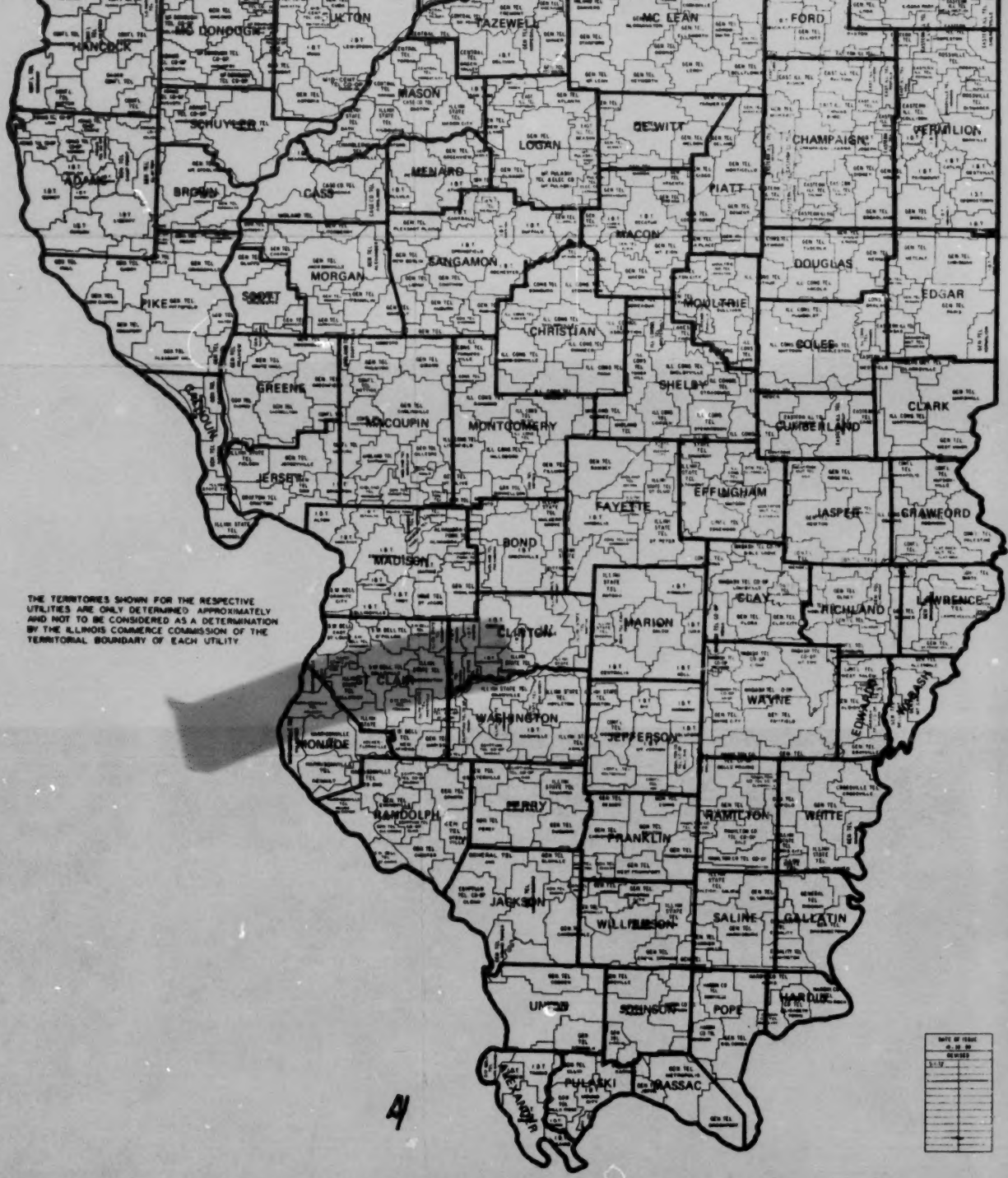

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ACKNOWLEDGEMENTS

This study was financially aided by Grant #1717 from the Illinois Law Enforcement Commission.

The State of Illinois has laid the groundwork for one of the most significant citizen-oriented emergency communication services available -- the statewide provision of the single emergency telephone number, 911. During the ten months of this study, the SRI project team of Thomas Dayharsh, Susan Ivy, Terrence Yung, and Gary Barker have received exceptional support from large numbers of Illinois local and state officials and from the state's telephone industry.

We wish to extend our special thanks to John Kissel and Tim Fox of the ICC for their excellent guidance and assistance. Special thanks are also due to David Goldberg of the ILEC for his considerable contribution of information and suggestions on the operations of law enforcement agencies in the state.

Two committees, the 911 Policy Committee and the 911 Telephone Industry Committee, have assisted the ICC and SRI during the course of this study. These committees have provided invaluable suggestions for the study effort and constructive criticism of the study output. This task has been especially formidable for the committees because of the highly interactive and iterative study process adopted by the ICC and SRI. These committee members (whose names are listed at the end of this acknowledgment section) contributed enormously to the success of the study.

Many hundreds of local Illinois officials and other individuals (too numerous to thank individually) provided us with information that was of great value to this study. We wish to thank them collectively for their contribution to the study effort.

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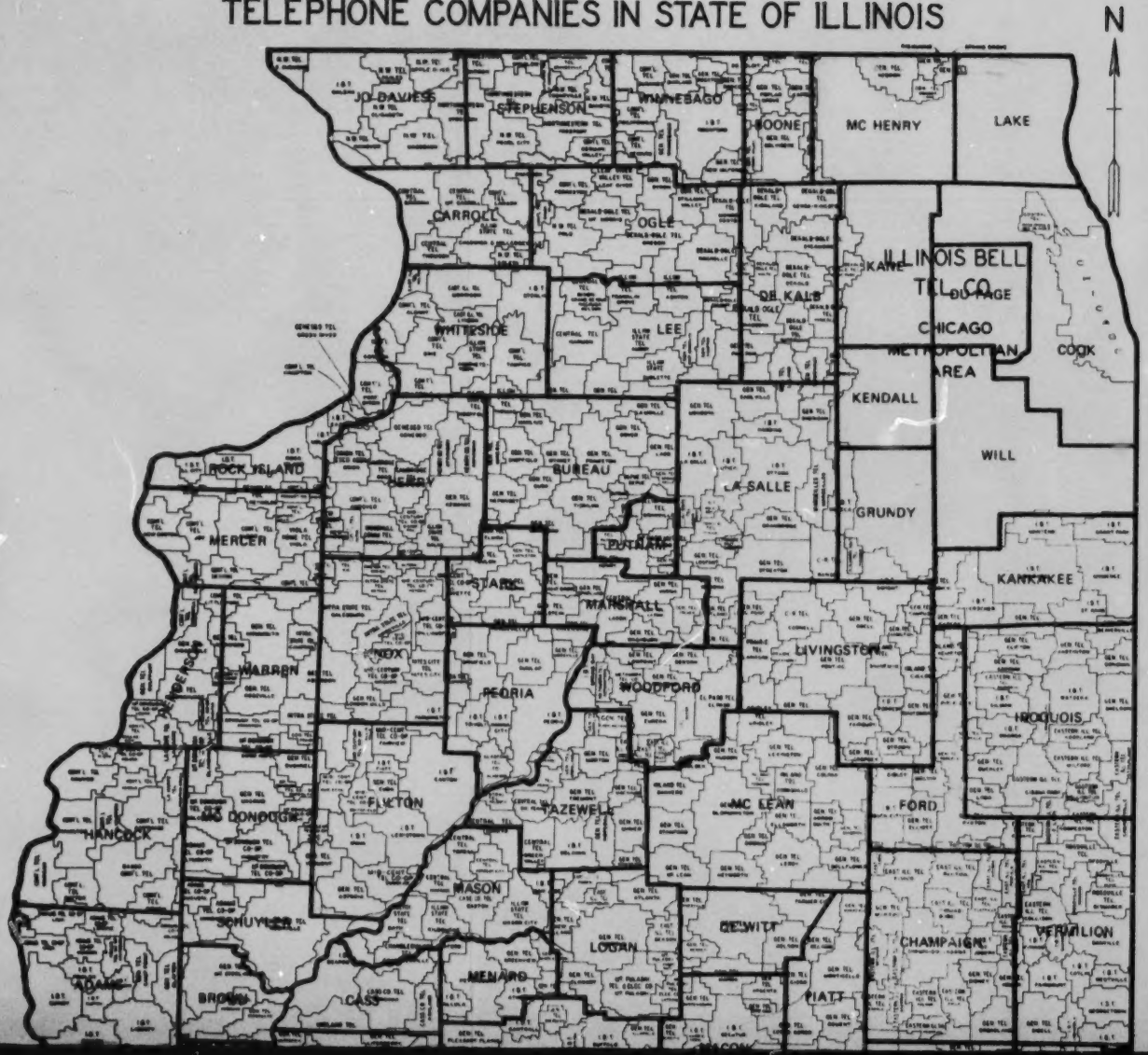
TELEPHONE COMPANIES IN STATE OF ILLINOIS



I INTRODUCTION

This report--Statewide Considerations in Illinois 911 System Development--is one of three documents that are the output of SRI project 4477.[1,2] This study has been performed by Stanford Research Institute (SRI) under the direction of the Illinois Commerce Commission (ICC) using grant funds provided by the Illinois Law Enforcement Commission (ILEC)--under provisions of the Omnibus Crime Control and Safe Streets Act of 1968, as amended.

The objective of this study has been to provide plans, programs, and strategies that will facilitate the implementation of statewide 911 systems as directed by the provisions of Illinois House Bill No. 911 (PA 79-1092). As a part of this study, we have performed five basic tasks:

- Surveyed Illinois 911 systems, public safety agencies, telephone systems, demographic data, and the desires of state and local personnel.
- Analyzed this information to determine the organizational, fiscal, technical, and operational constraints on 911 system development.
- Described specific problem areas that will impact on 911 system development in Illinois.
- Developed nearly 500 local alternative 911 systems for consideration by local 911 committees.
- Recommended state and local actions needed to provide orderly implementation of 911 systems.

---

1. T. I. Dayharsh, T. J. Yung, S. C. Ivy, G. E. Barker, "Illinois Local Government 911 Planning Manual", SRI Project 4477, June, 1976.
2. T. J. Yung and the ITA, "Illinois 911 Telephone Planning Manual", SRI Project 4477, June 1976.

The results of these tasks were discussed with the state 911 Committee during the course of the study. Consequently, the results presented in these final documents represents extensive input from Illinois government, public safety, and telephone company personnel.

In the remainder of this chapter, we will briefly discuss the contents of the planning manuals and of this report.

A. Local Government 911 Planning Manual

The Local Government 911 Planning Manual describes a systematic process by which local governments, public safety agencies, and telephone companies can interact with one another, and with the state, to develop local 911 systems. The manual also contains a discussion of the major benefits of 911 to Illinois citizens and a set of nearly 500 local alternative 911 systems.

Specifically, the manual covers the following basic local area 911 planning steps:

- Formation of local 911 committees
- Analysis of local jurisdictional, public safety, and telephone situations and boundaries
- Evaluation of call handling techniques and standards
- Analysis of alternative 911 configurations and public safety answering points (PSAPs)
- Evaluation and selection of a 911 management structure
- Selection of a 911 alternative system
- Preparation of preliminary 911 plans
- ICC Authority
- Continued 911 activities.

The planning process has been set up so that the local 911 committees have complete information at their disposal for each decision that they need to make. It is anticipated that at least one meeting will be required for each of the above planning steps and that several months will elapse between the start and the end of the planning process.

B. Telephone Company 911 Planning Manual

The Telephone Company 911 Planning Manual is provided to local telephone companies to guide their participation in the local 911 planning process. The manual is intended to:

- Provide guidelines for telephone company planning including coverage of its responsibilities in developing 911 systems
- Aid in understanding telecommunication requirements of agencies by describing central office requirements, network arrangements, terminal equipment, available features, interconnection arrangements where required, community contact procedures, and other related items
- Give appreciation of costs and efforts required to implement the telephone company portion of 911 systems
- Point out the impact of the Illinois Law (HB911) which requires that every telephone company provide telecommunications capability so that basic 911 can be implemented and operating by December 31, 1985.

This planning manual provides guidance to telephone companies for their participation in the development of cost-effective 911 systems.

C. Statewide Considerations in Illinois 911 System Development

This report complements the two planning manuals by providing a macroscopic view of the state's 911 situation. The ten chapters of this report contain discussions of:

- The current situation in Illinois and national 911 systems development
- Local perceptions of 911 and local requirements for successful 911 systems
- Telephone and public safety situations in the state and the impact of these situations on Illinois 911 system development
- Financing of 911 systems, including comparison of local and state financial alternatives and possible state subvention

- Management of 911 systems including the most appropriate form for a given local situation

- The role of the Illinois Commerce Commission (ICC) in the development, implementation, and evaluation of Illinois 911 systems

- Problem areas that impact on 911 development but which are beyond the scope of this study

- A program for the implementation of 911.

In addition, three appendices contain: ancilliary 911 requirements, HB911, and a subvention formula for state consideration.

II CURRENT ILLINOIS 911 SYSTEMS

By December 31, 1975, there were 23 operational 911 systems in Illinois. We contacted these centers to obtain descriptive information and details of their operations and implementation. This chapter contains the information obtained on the systems and discusses its relevance to the state-mandated 911 systems.

A. Description of Existing 911 Systems

Although some of the existing 911 systems became operational prior to 1970, the majority were implemented within the last three or four years (see Table 1). With only two exceptions, these 911 systems include only single incorporated areas: 1) Forest Park and River Forest have the only system where two municipalities joined into one communications unit, and 2) Perry County has a 911 system which includes four incorporated areas. The population served by these 911 systems varies from five thousand to 88 thousand, and is either distributed totally within one political jurisdiction or partially in another jurisdiction. That is, although some 911 systems have been implemented in cities whose boundaries match their telephone exchange, many have been forced to contend with a boundary mismatch. This occurs when the telephone exchange boundary does not match the political jurisdiction, and the 911 answering point receives calls for agencies which are not in the system. This situation exists in 16 of the 21 systems surveyed--all 16 are answering the phone for an agency which does not officially belong to the system. As a result, we show all 16 as answering for two law enforcement agencies although most officially answer for only one agency.

In the case of fire calls, the problem is rather different. Generally, fire districts extend beyond the phone exchanges, so that the old fire number must be maintained for those citizens who are out of the exchange yet in the fire district. In many cases dispatch for fire is provided by the police, this is the case particularly where there is a rural fire protection district rather than a municipally-supported fire department. Some municipal fire departments are dispatched by the police as well. In cases where the fire department is self-dispatched, there is generally a tie line to provide instant contact between the answering center and the dispatch operations. In the one instance where this is not the case (Geneseo), there are discussions about moving the fire dispatch operations from the telephone central office

Table 1
EXISTING 911 SYSTEMS IN ILLINOIS
(As of 12-31-75)

Answering Center		Date In Service	No. of Inc. Places	Pop. (000)	No. of Public Safety Agencies				Number of 911 Lines[2]	Telephone Company: Central Offices
Operating Agency	City				Police[1]	Fire	Amb.	Other		
Salem PD	Salem	12/69	1	6	2	1	0	-	2D	Illinois Bell: Salem
Evanston PD	Evanston	4/70	1	88	1	1	1	-	16D	Illinois Bell: Evanston
Mount Vernon PD	Mt. Vernon	5/70	1	16	2	1	0	-	3D	Illinois Bell: Mt. Vernon
Vandalia PD	Vandalia	9/70	1	6	2	1	0	-	2D	Illinois Bell: Vandalia
Plano PD	Plano	6/72	1	5	2	1	1	-	2D	Illinois Bell: Plano
Oak Park PD	Oak Park	4/73	1	63	1	1	1	-	9D	Illinois Bell: Oak Park
Forest Park PD and River Forest PD (Dual Answering)	Forest Park & River Forest	6/73	2	29	2	2	2	-	6D	Illinois Bell: Oak Park
Crystal Lake PD	Crystal Lake	9/74	1	17	2	1	1	-	4D	Illinois Bell: Crystal Lake
Brookfield PD	Brookfield	10/74	1	20	1	1	1	-	3D	Illinois Bell: La Grange
Moline PD	Moline	11/74	1	47	2	1	1	-	9D	Illinois Bell: Moline
Marengo PD	Marengo	1/75	1	5	2	1	1	-	2D	Illinois Bell: Marengo
Woodstock PD	Woodstock	7/75	1	14	2	1	1	1[3]	5D	Illinois Bell: Woodstock

TABLE 1 (Concluded)
EXISTING 911 SYSTEMS IN ILLINOIS
(As of 12-31-75)

Answering Center		Date In Service	No. of Inc. Places	Pop. (000)	No. of Public Safety Agencies				Number of 911 Lines[2]	Telephone Company: Central Offices
Operating Agency	City				Police[1]	Fire	Amb.	Other		
Tinley Park PD	Tinley Park	6/75	1	22	2	1	1	-	4D	Illinois Bell: Tinley Park
Glencoe PD	Glencoe	6/75	1	10.5	1	1	1	1[3]	3D	Illinois Bell: Winnetka
Wilmette PD	Wilmette	10/75	1	33	1	1	1	-	3D	Illinois Bell: Wilmette
Peoria PD	Peoria	12/75	2	130	3	3	1	-	17D	Illinois Bell: Peoria
Bloomington PD	Bloomington	2/69	1	41	2	1	1	-	6D	General: Bloomington Main Bloomington East
Normal PD	Normal	2/69	1	32	2	1	1	-	3D	General: Bloomington Normal
Washington PD	Washington	5/71	1	15	2	1	1	-	2D	General: Washington Sunnyland
Perry County SO	Pickneyville	12/73	4	21	5	3	1	-	5 D/T	General: Pickneyville DuQuoin Percy Continental: Tamora
Henry County SO[4]	Cambridge	5/73	1	7	2	-	-	-	1D	Cambridge: Cambridge
Geneseo PD	Geneseo	5/68	1	15	2	0	1	-	1D	Geneseo: Geneseo
Wolford County SO	Eureka	12/74	-	.4	-	-	-	-	1D	El Paso: El Paso

1. All 911 centers also answer calls for state police, generally relaying information over the radio.
2. D = Direct Trunked T = Tandem Trunked.
3. Public works.
4. Not currently in use.

to the police dispatch center. Currently, the telephone company operator is the only one who can activate the fire alarm system for this volunteer fire district.

Although most 911 systems provide access to emergency medical assistance as well as law enforcement and fire protection, medical assistance is provided by either the city or by one of the existing public agencies. None of the 911 centers is connected directly to a private ambulance company, although one center will contact the hospital-owned ambulance, if necessary. Consequently, no emergency medical service is offered by some of these 911 systems.

In all of the 911 systems implemented in Illinois to date, the incoming 911 lines are direct trunked. These lines are private lines connecting each telephone central office directly to the 911 answering center.

There are five 911 systems on order in Illinois, as shown in Table 2. Although it is too early to know how many 911 lines will be necessary for each system, the list shows the operating agency, city, county, phone company, and exchanges which are included.

B. Implementation of Existing 911 Systems

The impetus initiating serious discussion of 911 generally has come from one of three areas. Most commonly, the suggestion is made by either local law enforcement agencies or some branch of local government. Often the city manager, or perhaps a member of the Board of Trustees for a village, will raise the issue. Less frequently, the telephone company will approach either the police department or city manager and initiate discussions of 911. Table 3 presents this information for existing 911 systems in Illinois. In the vast majority of cases, 911 discussions were begun by either local government or law enforcement. We were not informed of any instance where a fire agency initiated these discussions. This sequence is schematically represented in Figure 1.*

In each instance the groups involved had certain concerns which had to be dealt with before a successful implementation could take place. These concerns tend to recur in similar form whenever 911 is an issue, so it seems worthwhile to outline briefly what they are. Since we are dealing with successful systems in this chapter, it seems useful to look for similarities in their implementation.

*In several counties, the Illinois Department of Public Health has initiated Central Medical Emergency Dispatch using Federal and foundation grants. This process has impacted on 911 development in these counties.

Table 2

911 SYSTEMS ON ORDER IN ILLINOIS

(As of 12-31-75)

perating Agency	City	County	Telephone Company: Central Offices
urora P.D.	Aurora	Kane	Illinois Bell: Aurora Main Aurora East
arvard P.D.	Harvard	McHenry	Illinois Bell: Harvard
alesburg P.D.	Galesburg	Knox	Intra-State Telephone: Galesburg
arseilles P.D. & F.D.	Marseilles	La Salle	Marseilles Telephone: Marseilles
hicago P.D.	Chicago	Cook	Illinois Bell:

Table 3

AGENCY THAT INITIATED 911

	Law Enforcement	City Government	Phone Company
Evanston	X		
Mt. Vernon			X
Plano		X	
Glencoe		X	
Oak Park	X		
Forest Park/ River Park	X		
Vandalia			
Crystal Lake		X	
Brookfield		X	
Marengo		X	
Tinley Park	X		
Moline	X		
Woodstock		X	
Wilmette		X	
Peoria	X		
Henry Co.	X		
Perry Co.	X		
Bloomington			X
Normal		X	
Washington			X
Salem			X
Genesco	X		

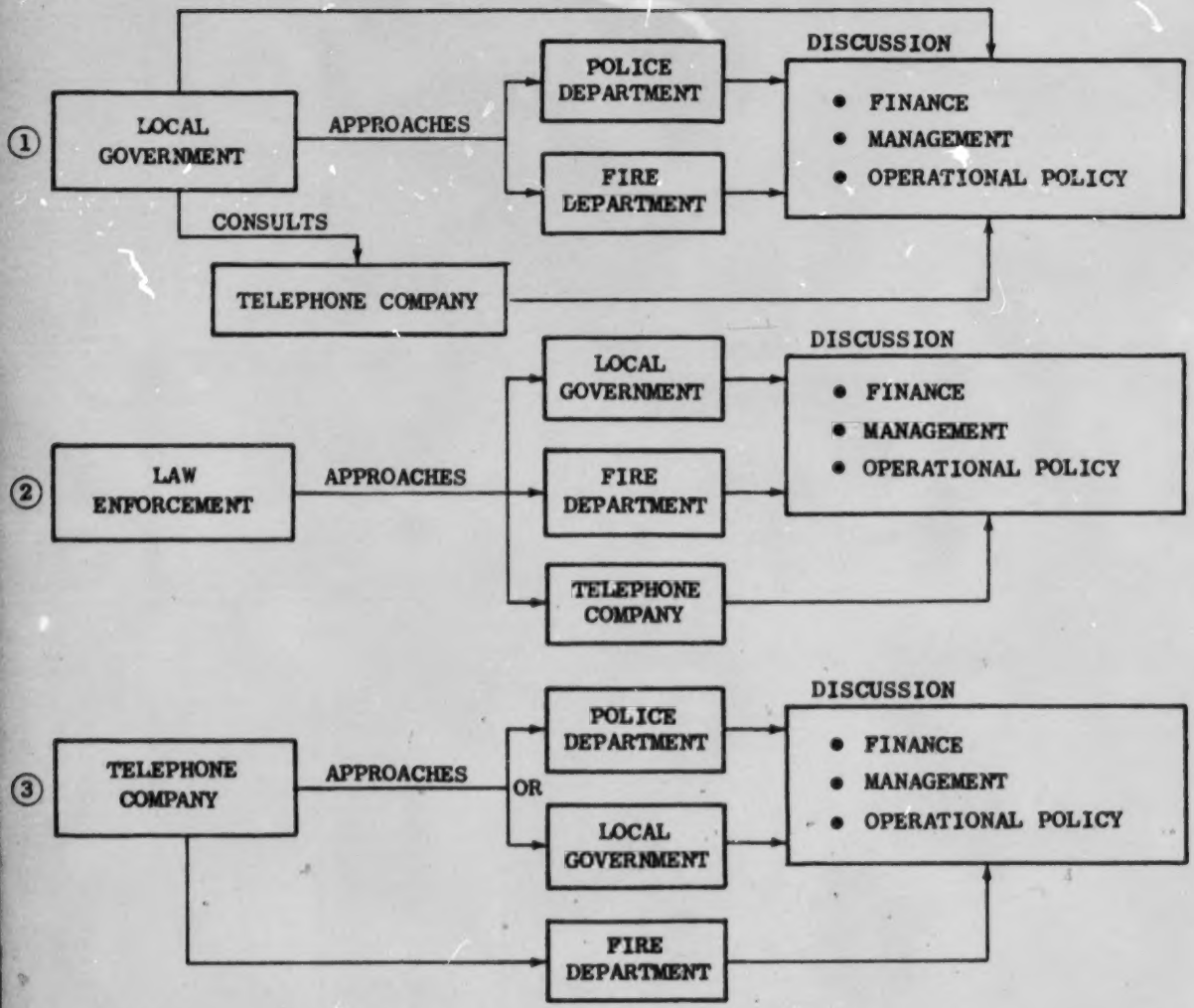


FIGURE 1 ALTERNATE PATTERNS OF 911 IMPLEMENTATION IN ILLINOIS

Regardless of who opened the subject of 911, all agencies felt that early discussions were important in establishing a working relationship. In each case, the police, fire, and city government spent substantial time discussing the virtues and drawbacks of the proposed system. This enabled them to establish a concensus about finance, management, degree of dispatch consolidation (i.e. inter-agency cooperation), and other important but controversial issues. Consequently, when a decision to implement was made, there was already agreement about who would manage the system. The degree of cooperation shown by the telephone companies was also held to be important, as the telephone companies furnished needed information on technical problems, costs, and related matters.

These discussions seemed to go fairly smoothly in 911 systems covering a single jurisdiction, but discussions involving multiple jurisdictions were more complex. Generally, compromises were greater, and the degree of consolidation less. In the one operational system where the operating agency implemented a 911 system without gaining the cooperation of all involved agencies, utilization is far below what might be expected in a system of this size. The early discussions are extremely important in establishing a working cooperation among agencies in a potential 911 system.

C. Operating Policies of 911 in Illinois

The operating policy for the 911 systems generally reflect the jurisdiction' answers to the problems of implementing 911. These answers reflect the unique components of each local jurisdiction as well as the requirements for operating such a system. This subsection discusses some of the answers developed by the jurisdictions.

1. Finance

There are two methods currently used to finance 911 systems in Illinois. In areas where fire protection is provided by a volunteer or rural fire district serving more than the incorporated town, there is generally no attempt to develop a mechanism to divide the cost between the police and fire services. Either the police budget is itemized to include necessary 911 expenditures, or the "telephone bill" goes directly to the city clerk. The police, as an operating agency, pay for the communications personnel. Since these individuals are necessary in any case, this expense is not considered an additional one.

Where the 911 system includes a municipal fire district or multiple tax supported agencies, a cost sharing device is often utilized. Costs may be assessed on a set fee basis, where participants pay a stated monthly amount, or agencies may contribute according to the amount of service they receive.

These are the two major payment schemes, although details vary from region to region. It is important to note that the majority of existing 911 systems cover fairly limited areas. Consequently, funding techniques which work in these systems may not be applicable to the more complex 911 systems that will evolve from HB 911. It should also be noted that the cost of 911 in all existing cases falls back onto the property tax, the major source of income for local governments.

2. Local Autonomy

In many instances, 911 implementation was delayed because one local agency was afraid it would lose its identity if communications were to be consolidated. This situation was most prevalent in areas where early discussions between participants were minimal. These concerns were dealt with in a number of ways: (1) the level of discussion was increased, (2) a joint management committee was formed, or (3) each agency retained its dispatch function (this solution was the most common). Our survey indicates that these solutions were the most common approaches to this problem. Problems did not seem to arise where there was a history of cooperation, most particularly cooperative dispatch. However, such cooperation does not exist throughout the State, so other methods of achieving concensus--as described in the planning manuals--must be used.

3. Areas of Dissatisfaction

Although the majority of agencies contacted were satisfied with 911, there were some agencies that voiced concerns. A major problem in some areas was the lack of clear policy about proper use of 911. For example, in areas which took administrative calls on 911, there was a strong concern about the effectiveness of 911 systems. A much higher level of satisfaction was reported when administrative calls were referred.

A second area of dissatisfaction occurred in systems that were seriously under utilized. That is, because of failure to advertise, and/or lack of interagency cooperation, the number of 911 calls was very low. This has caused some local governments to reconsider the value of 911 systems. Again, the planning manuals contain discussions of how to avoid this problem.

D. Implications for Statewide 911

Existing 911 systems in Illinois provide significant examples for the state. However, these examples must be interpreted and used with care. There may be a tendency at the state level to conclude that all localities can easily provide 911 for their citizens, since many such systems already exist. Given the population/resources distribution in the state at this time, the above conclusion is not warranted. Those areas which are already providing 911 developed their systems in response to local initiative. The support that they received caused local officials to conclude that 911 was a worthwhile local program and to allocate funds to this end.

Now that 911 is mandated by the state, this choice is no longer available to local officials. They must implement 911, regardless of the adequacy of their resources for such a program. In some situations this inadequacy could create severe fiscal and/or management hardship(s). Consequently, state legislators cannot assume that 911 can be implemented solely by local resources, merely because this situation existed prior to HB 911. Only 23 local jurisdictions had made this choice; the others are having the choice made for them--a contingency which alters the original local position.

Existing and planned local 911 systems do provide working examples of the problems encountered when 911 is developed and operationalized without adequate forethought. These examples fall into two rough categories.

(1) Intrasystem problems center around: the failure to gain full support of all participants; the failure to adequately define operational policy; and the failure to adequately advertise proper 911 use. The local Government Planning Manual was developed in order to minimize these problems. The ICC-promulgated standards are being developed with the same goals in mind.

(2) Intersystem problems were generally caused by the failure to adequately consider the needs and desires of surrounding jurisdictions before 911 was operationalized. State Standards and the Planning Manuals are aimed at minimizing these situations and the ICC is charged with resolving them.

State support of these documents (through adequate ICC staffing) will minimize the problems that have developed in the past.

E. Implementation and Legislation of 911 in Other States

Over 460 911 systems serving more than 33 million citizens have been implemented throughout the United States. Another 100 systems are scheduled for implementation in the near future as shown in Table 4.

Four states have passed 911 legislation to date, these are (in order of approval): California, Florida, Louisiana, and Illinois. The general provisions of the laws for California, Illinois, and Louisiana are similar. These laws establish dates for the formulation of technical and operational standards, tentative 911 plans, final 911 plans, and definition of funding requirements. The Florida legislation is unique in that the requirement for tentative and final 911 plans has been identified, but the legislation does not require these plans from the local agencies until specified periods after the state 911 plan has been developed.[3]

In the case of California, Illinois, and Louisiana, the legislation provides for an analysis of the financial impact of 911 implementation and requires that this information be provided to the appropriate agencies by specified dates. In Florida, a statewide 911 study was actually ongoing when legislation was enacted. Again, in Florida, the cost of implementing 911 must be identified by the State Division of Communications.

A principle difference between the Illinois legislation and that of the other states is that Illinois has placed the responsibility for planning and implementation with a state regulatory agency instead of a communication or public safety agency as has been done in the past. In all cases, the states have stressed the importance of centralized communication services. They have also stressed the

3. K. D. Felperin, T. J. Yung, et. al., "911 In Florida: A System Concept," Final Report, SRI Project 3101, August, 1974

Table 4

NATIONWIDE STATUS OF 911 IMPLEMENTATION*

State	In Service Systems		Scheduled Systems	
	Number of Systems	Population served (000)	Number of Systems	Population served (000)
Alabama	35	1,734	2	10
Alaska	4	155	6	82
Arizona	7	67	1	400
Arkansas	2	57	---	---
California	13	607	9	856
Colorado	6	766	5	725
Connecticut	22	733	2	75
Delaware	---	---	---	---
Dist. of Columbia	1	764	---	---
Florida	4	180	6	1,449
Georgia	4	288		
Hawaii	---	---	---	---
Idaho	1	35	3	115
Illinois†	17	413	9	3,664
Indiana	10	316	9	1,348
Iowa	4	169	1	8
Kansas	6	109	5	83
Kentucky	5	91	1	180
Louisiana	10	555	---	---
Maine	3	42	1	4
Maryland	3	1,320	---	---
Massachusets	28	1,802	8	85
Michigan	6	1,824	5	382
Minnesota	4	65	---	---
Mississippi	25	569	1	3
Missouri	7	237	1	39

Table 4 (concluded)

STATE	In Service Systems		Scheduled Systems	
	Number of Systems	Population served (000)	Number of Systems	Population served (000)
Montana	4	95	---	---
Nebraska	29	930	6	28
Nevada	5	20	---	---
New Hampshire	1	26	---	---
New Jersey	5	643	4	536
New Mexico	7	487	---	---
New York	15	11,165	1	20
North Carolina	4	120	1	35
North Dakota	1	47	---	---
Ohio	7	190	3	61
Oklahoma	9	178	---	---
Pennsylvania	29	2,807	3	77
Rhode Island	---	---	---	---
South Carolina	2	76	---	---
South Dakota	4	156	---	---
Tennessee	45	1,605	6	791
Texas	13	409	---	---
Utah	2	56	1	400
Vermont	---	---	---	---
Virginia	9	185	---	---
Washington	9	845	---	---
West Virginia	4	78	---	---
Wisconsin	3	116	1	5
Wyoming	21	125	---	---
TOTAL	462	33,324	104	11,507

* The information in this table was taken from AT&T's 911 Report dated December 1974

† Current data on the status of 911 implementation in Illinois is given elsewhere in this report.

need for increased use of mutual aid and joint powers agreements to assist in the development of centralized communication services and expand the geographical area of responsibility of the public safety agencies.

In addition to the above four states, Missouri, Oregon, and Washington introduced 911 legislation during their past legislative sessions. The bills for Missouri and Washington were similar to the California, Illinois and Louisiana legislation. The bill in Oregon was to direct the Office of Public Utilities Commissioner to study the feasibility of 911 in Oregon. Although these three bills were defeated in committee during the last session, we anticipate that these bills will be reintroduced in the next state session and that new bills will be introduced in other states in the future.

III REGIONAL MEETINGS AND QUESTIONNAIRES

During the study a substantial effort was made to both inform local personnel of 911 planning efforts and to solicit information from them on operations, management, and finance of alternative 911 systems. Two means were used to accomplish these objectives: 1) teams of SRI and ICC personnel distributed questionnaires at local meetings conducted throughout the state, and 2) questionnaires were mailed to public and private ambulance companies throughout the state. In this section of the report, we discuss our analyses of the information acquired by these means.

A. Regional Meetings

As a result of a 911 Advisory Committee meeting of November 6, 1975, it was decided that an intensive effort should be made to communicate 911 information to the local level. At that meeting, the Illinois State Police offered to assist in setting up and hosting meetings in their districts. In early December, 14 regional meetings were conducted throughout the state with local police, fire, emergency medical, telephone, and government officials invited to the meetings.

A total of 611 persons attended these 14 meetings. Figure 2 shows the composition of the State Police Districts; the Cook, Elgin, and Oak Brook Districts were not included in the presentations because of their size and unique problems. District names will be used in this section as a basis for discussion of questionnaire results.

In Tables 5 and 6 the data is grouped by respondent groups. Table 5 contains the responses of the statewide respondent groups (e.g., all fire respondents, all Emergency Medical (EM) respondents, and so on) while Table 6 contains the responses of the regional police and fire respondent groups.

These tables contain a great deal of information that is important in the development of Illinois 911 systems. We urge 911 committee members to carefully study this data in order to determine its impact on the development of local 911 systems.

First, Table 5 considers the expectations of the respondent groups that 911 will improve the operations of their own and other services. Overall, 62% of the respondents expect 911 to improve police operations, 43% expect 911 to improve fire operations, and 59% expect 911 to improve ambulance operations. Generally, the most optimistic group was the police and the most pessimistic group was the fire. Only fire

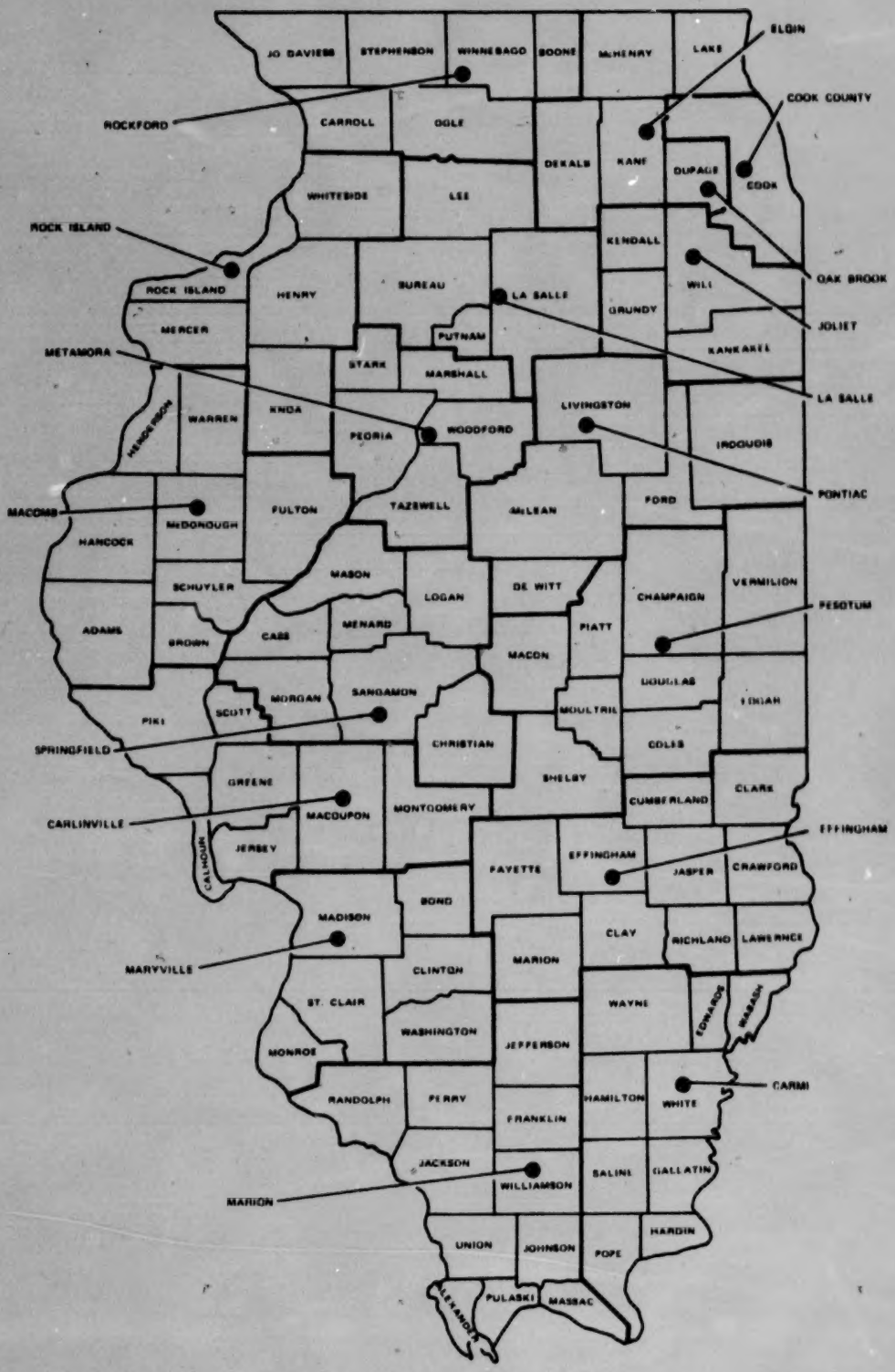


FIGURE 2 ILLINOIS STATE POLICE PROPOSED REDISTRICTING PLAN

Elements Being Considered	All	Respondent Group			
		Police	Fire	Emerg. Med.	Govt.
Call Handling					
Direct Dispatch	55%	60%	52%	62%	44%
Call Transfer	29	23	34	30	26
Call Relay	12	12	10	8	23
Call Referral	4	5	4	0	7
Mangt. Technique					
Joint Powers	59%	56%	59%	75%	52%
Contract	32	36	31	21	45
Special Dist.	9	8	10	3	3
Improved Service Expected from 911					
Police	62%	74%	47%	64%	67%
Fire	43	58	31	42	58
Emergency Med.	59	67	45	85	52
Preferred Configuration					
County	56%	63%	50%	57%	66%
Subcounty	34	27	46	30	29
Multicounty	10	10	4	13	5

Table 5 SUMMARY OF QUESTIONNAIRE RESPONSES BY OVERALL RESPONDENT GROUPS

District	Group	Percentage Favoring Direct Dispactch*	Percent Favoring:			Percent Favoring:		
			J.P.	Cont.	S.D.	Co.	Sub.Co.	Mult.Co.
Joliet	Police	64	45	45	10	33	66	0
	Fire	57	55	45	0	10	90	0
La Salle	Police	29	46	46	8	33	58	8
	Fire	32	67	27	6	21	79	0
Pontiac	Police	58	82	18	0	70	30	0
	Fire	75	54	38	8	50	40	10
Pesotum	Police	44	75	13	12	78	11	11
	Fire	40	70	30	0	88	0	12
Effingham	Police	33	40	50	10	38	38	24
	Fire	33	60	20	20	75	25	0
Carmi	Police	100	80	20	0	80	0	20
	Fire	80	60	20	20	80	0	20
Marion	Police	67	33	50	17	67	0	33
	Fire	88	25	50	25	17	83	0
Maryville	Police	0	50	25	25	25	50	25
	Fire	75	75	25	0	50	50	0
Carlinville	Police	50	50	50	0	75	25	0
	Fire	Insufficient Data	100	0	0	50	50	0
Springfield	Police	88	50	37	13	85	15	0
	Fire	100	17	50	33	50	50	0
Macomb	Police	64	55	33	12	85	0	15
	Fire	86	50	50	0	100	0	0
Metamora	Police	100	50	33	17	60	40	0
	Fire	63	40	57	13	50	25	25
Rock Island	Police	100	50	50	0	51	38	11
	Fire	57	72	0	28	14	86	0
Rockford	Police	63	69	31	0	72	8	20
	Fire	31	60	27	13	69	15	16

* For all cases where the percentage of respondents favoring direct dispatch was less than 50%, the respondent groups preference was for call transfer.

Table 6 SUMMARY OF QUESTIONNAIRE RESPONSES BY REGIONAL RESPONDENT GROUPS

respondents were pessimistic about their own services, e.g., both the police and EM respondents were optimistic about their own services. Approximately one-half of the fire respondents believed that 911 would improve police and emergency medical operations, but less than one in three (31%) believed it would improve their own service. EM respondents shared this pessimism about the impact of 911 on the fire systems, with the pessimism of these two respondent groups overweighing the optimism of the police and government respondents, causing the low average of 43% of the respondents that expect 911 to improve the fire service.

We consider the overall pessimism of the fire service the most critical factor that surfaces from these questionnaires. In order to overcome this pessimism, we believe that fire personnel must use the planning process described in the planning manuals in order to develop mechanisms whereby 911 can benefit their services to the citizens. ICC personnel and local 911 system participants will have to carefully assess the requirements of the fire service in each 911 system so that optimal 911 systems are developed.

Generally, however, the high levels of optimism of the respondents is a positive indication of grass roots support for Illinois 911 systems.

Next, from Table 6, we can see that the largest percentages of each respondent group prefer 911 systems that use direct dispatch 911 call handling techniques, are managed under joint powers agreements, and are countywide in scope. There are significant minorities in each respondent group that prefer other 911 call handling techniques, are managed under contract agreements, and are subcounty in scope.

Many fire and government respondents are willing to use call transfer rather than direct dispatch. We infer from this that there may be more fire departments than police and EM facilities that will be linked to the 911 centers by call transfer techniques.

In order to provide a synoptic view of these preferences, we have constructed Table 7. This table has been organized by descending order of system preference from left to right. Thus, 12 respondent groups favored direct dispatch/joint powers/county 911 systems while only one group favored a call transfer/contract/county 911 system. Note that all but one possible combination of these three system characteristics--that of call transfer/contract/subcounty--was selected by at least one group of respondents.

District	Service	911 System Characteristics *						
		DD/JP/Co.	DD/JP/SCo.	CT/JP/Co.	DD/Con./Co.	CT/JP/SCo.	DD/Con./SCo.	CT/Con./Co.
Joliet	Police		X					
	Fire		X					
La Salle	Police					X		
	Fire					X		
Pontiac	Police	X						
	Fire	X						
Pesotum	Police	!		X				
	Fire			X				
Effingham	Police							X
	Fire			X				
Carmi	Police	X						
	Fire	X						

* where: DD = Direct Dispath, CT = Call Transfer, JP = Joint Powers, Con = Contract, Co. = County, SCo. = Subcounty

Table 7 SUMMARY OF SYSTEM PREFERENCES OF REGIONAL ILLINOIS GROUPS

District	Service	911 System Characteristics*						
		DD/JP/Co.	DD/JP/SCo.	CT/JP/Co.	DD/Con./Co.	CT/JP/SCo.	DD/Con./SCo.	CT/Con./Co.
Marion	Police				X			
	Fire						X	
Maryville	Police					X		
	Fire		X					
Carlinville	Police	X						
	Fire	X						
Springfield	Police	X						
	Fire				X			
Macomb	Police	X						
	Fire	X						
Metamara	Police	X						
	Fire				X			
Rock Island	Police	X						
	Fire		X					
Rockford	Police	X						
	Fire			X				

Table 7 (concluded)

In those cases where police and fire respondents from the same region prefer common system characteristics, and assuming that their preferences reflect those of the rest of the region's agencies and jurisdictions, 911 system design and implementation should be fairly smooth. It would include seven of the districts with the following 911 system characteristics: DD/JP/Co, DD/JP/SCo, and CT/JP/Co (see code on bottom of Table 7).

In other districts, assuming that the respondents are representative of these districts, the police and fire services would have to compromise on some 911 system characteristics. These compromises would be in the areas of system management form, call handling techniques, or in the number of 911 centers. Generally, more than one call handling technique can be employed by a 911 center, so that the more important areas of compromise are in the management and system size areas.

According to these respondents, management agreements will have to be reached in three districts. System size agreements (county or subcounty) will have to be reached in two districts. Generally, we believe that there is good agreement on a regional basis on the type of 911 system desired. As these agreements cover pretty much the entire gamut of 911 system possibilities, it is necessary for the planning manuals[1,2] to provide guidance to the local areas for developing any desired type of 911 system.

B. Analysis of Emergency Medical Services Questionnaires

Questionnaires were mailed to approximately 575 public and private agencies providing emergency medical services throughout the state. The purpose of these questionnaires was to determine the types of service, training levels, and dispatch characteristics of the existing agencies. Approximately 300 of these questionnaires were completed and returned.

There was insufficient information in 67 of the returned questionnaires to determine if the agency was public or private. Of the remaining questionnaires, 65 percent were from public agencies and 35 percent were from private agencies. An analysis of this information is provided in this section. While reviewing this analysis, the reader must remember that data are averages for approximately 50 percent of the agencies in the state. When 911 systems are implemented, the composition of the EM resources in each system will probably vary from the averages presented here.

1. Hours of Training

The EMS attendants throughout the state were divided into three groups according to their hours of training: less than 44 hours (basic first aid), 44 to 85 hours (advanced first aid), and greater than 86 hours (EMT-1A or higher rating). These categories are general, but they do indicate current levels of training. The distribution of the training for the attendants is shown below:

	Hours of Training		
	Less than 44 hours	44 to 85 hours	More than 86 hours
Public (3300 attendants)	15%	33%	52%
Private (800 attendants)	12%	26%	62%
Overall	14%	32%	54%

This data shows that although a higher percentage of the public attendants have received 44 to 85 hours of training, a higher percentage of the private attendants have received more than 86 hours of training.

Combining the percentages for 44 to 85 hours with those for more than 86 hours of training, we can see that 85 to 88 percent of all attendants are taking or have completed advanced first aid.

2. Dispatch Operations

To gain an understanding of the ambulance dispatching operations, we assessed the percentage of ambulance operations providing their own 24 hour dispatch operations and the percentage which are dispatched by an agency other than their own. We considered public operations separately from private companies in order to identify differences between the services. Data from each district was generally too small to be statistically reliable, so we used composite totals to indicate different dispatch patterns.

The composite results are shown below:

	24 Hour Dispatch		Less than 24 Hour Dispatch	
	own center	other center	own center	other center
Public	50%	45%	4%	1%
Private	74%	23%	3%	--

It is apparent that more public than private ambulance companies are dispatched from another agency's dispatch point. These data show that private ambulances are less commonly (only 1 in 4) dispatched by other agencies. This result indicates that emphasis must be placed on developing 911 interactions between the dispatch facilities of private ambulance companies and PSAPs. Alternatively, consideration should be given to including the dispatching of the private ambulances from the PSAPs (assuming single stage PSAP operations). This will be necessary in order to fulfill the requirement in HB911 that all 911 centers provide emergency medical assistance.

IV TELEPHONE AND PUBLIC SAFETY SITUATIONS

This chapter describes factors affecting the development of alternative 911 systems for the state. We address the problems of implementing 911 in Illinois in the context of the boundary mismatch between local government jurisdictions and telephone company exchange areas, the existing fragmentation of radio dispatch centers, and certain potential limitations of telephone company switching equipment. This chapter contains only a general overview of these factors; the 911 planning manuals[1,2] provide the local governments and telephone companies with detailed information on how to implement 911 systems within these constraints.

A. Boundary Mismatch

The non-coincidence (mismatch) of telephone and jurisdiction/agency boundaries is the single factor that makes 911 system development quite complicated. Boundary mismatch must be accommodated through a process of intergovernmental and interagency agreements that provides cost-effective 911 systems to Illinois citizens.

The citizens of Illinois are now receiving telephone service from 65 different telephone companies owning and operating almost 1,000 central offices. Figure 3 is a map of Illinois showing the names and locations of these central office areas. Only in a very few cases do these central office areas correspond to jurisdictional boundaries or the service areas of public safety agencies.

For example, the mismatch of county boundaries and telephone boundaries is evident from Figure 3. Most central offices in Figure 3 are located in an incorporated area; we can see that the areas included by these central offices generally exceed the boundaries of the incorporated areas. Thus, a particular countywide 911 system will have portions of adjacent counties included in its system and portions of its own county included in the 911 systems of adjacent counties. Similarly, a 911 system for an incorporated area will contain parts of adjacent unincorporated area (sheriff and fire district territory) or adjacent incorporated areas.

To accommodate this problem, the planning manuals provide local 911 committees with procedures to develop, evaluate, and select the best 911 alternative for their area.

B. Extent of Dispatch Decentralization

The State of Illinois consists of 102 counties and more than 1250 incorporated cities, towns, and villages. Public safety services are provided by nearly 600 law enforcement agencies, more than 1200 fire protection agencies, and more than 700 emergency medical transportation (ambulance) service agencies. In addition to these local public safety agencies, there are a number of state and national agencies which can provide emergency services.

Currently, these agencies are predominantly self-dispatched. There has been little consolidation of dispatch services among like services (adjoining law enforcement or fire protection agencies) or between city departments (police and fire departments), although a small number of consolidations have occurred in metropolitan areas. These existing consolidations involve varying degrees of consolidation from several police dispatching operations to consolidation of several police and fire department dispatch operations.

The current decentralization of the dispatching services intensifies the complexity of implementing 911 in many areas of the state. As discussed in the previous section (on boundary mismatch), there is a sizable discrepancy between telephone boundaries and public safety jurisdictional boundaries. Consolidation of dispatching services over several jurisdictions and larger geographical areas could alleviate the problem of selecting the best center to receive 911 emergency calls. The planning manuals describe techniques for selecting 911 alternatives and providing interagency coordination.

C. Telephone Plant Limitations

Telephone company central office switching equipment is usually classified as belonging to one of two general categories or types of equipment: common control or direct/progressive control.

In common control equipment the dial pulses from the calling telephone are registered, analyzed, and re-sent in the form of a routing code to operate switches as required to establish the desired connection. Such equipment has logic circuits built into it and is sometimes described as being "semi-intelligent." Common control equipment, which includes crossbar, electronic, and certain modified step-by-step equipment, is the simpler and less expensive of the two types to condition (or modify) for accepting and routing 911 calls.

In direct/progressive control equipment, the dial pulses from the calling telephone directly control the switches that establish the desired connection. This type of system might be described as a slave to the digits that are dialed. Modification of direct control equipment, which includes step-by-step, all-relay, and motor-switch equipment, has different problems and solutions, depending on whether a telephone number prefix beginning with the digit 9 is involved.

In a central office where no prefix starts with the digit 9 and whose calls are not routed to an office where this situation exists, the first problem in modifying the equipment to accept and route 911 calls is to clear (i.e., make available) the ninth level of the first selector. A selector is an electromechanical switch that connects an incoming call to one of many (usually 100) output circuits. Two principal things must be done to clear the ninth level of the first selector: (1) the dial speed test, revertive call, and other administrative functions assigned to this level must be reassigned; and (2) the absorb and blocking class marks must be removed from this level. These two actions require considerable rewiring. Further, an additional bank of second and third selectors might have to be purchased and installed.

Central offices whose prefix begins with 9 or whose calls are automatically routed to an office having a 9 prefix are sometimes more expensive to modify for the receipt of 911 calls than are central offices whose prefix begins with other numerals. Modification may require only that a bank of second selectors be bought and installed, or it may require that the office be directorized (senderized). The latter means adding additional special equipment that will provide the direct control equipment with some common control capability.

The switching equipment and operational modifications mentioned above are technically feasible. However, some telepnone companies may view them as economically unfeasible. Since an Illinois 911 law now exists, the major problem is the speed with which the telephone companies can modify their switching equipment.

The costs to the telephone companies for modifying their switching equipment is estimated on a statewide basis to be between $6.8 and $7.2 million. These estimates, which were prepared in late 1975, were based on current costs and did not include any inflationary effects.

The availability of selective call routing in any area of the state will be affected by two primary factors. Before the telephones being served by an exchange can be selectively routed, each central office must have the capability of automatically determining and forwarding the telephone number of the calling telephone. Also, each 911 system area that is to be selectively routed must either have access to a central office with electronic switching equipment, or install a special computer.

V COST OF 911 SYSTEMS IN ILLINOIS

A. Introduction

In this chapter, a range of estimated cost for statewide 911 systems is discussed. In Appendix B of the "Illinois Local Government 911 Planning Manual," the approximate costs of 480 alternative 911 systems are developed. Alternative 911 configurations were developed for: urban areas of 5,000 or more population; single counties, except for Cook, Du Page, Lake and Kane counties; multiple counties for counties of less than 20,000 population and with no cities of 5,000 or more population (31 counties fit these criteria); multiple counties centered on Illinois State Police (ISP) Districts except 28 urban systems and the counties of Cook, Du Page, and Lake; and two selective call routing alternatives for Cook County.

These alternatives have been combined in this chapter to develop the range of costs for the statewide systems. Costs from the planning manual have been used for this purpose (readers are urged to read this manual in order that they understand the assumptions that were used).

B. Alternatives Considered

Table 8 contains system and cost data for a number of possible statewide 911 system alternatives. The left hand column of this table describes the 911 systems being considered and is ordered by increasing numbers of required 911 systems. Each group of alternatives in this column provides complete coverage of the state.

The first group of alternatives (first row of Table 8) includes 15 ISP multicounty 911 systems, 28 city 911 systems, and 21 subcounty systems in Cook, Du Page, and Lake counties for a total of 64 systems. This minimum number of 911 systems would be implemented if the local 911 committees select from the alternatives in Appendix B of the planning manual.

There would be a maximum of 232 nonselectively routed 911 systems (bottom row of Table 8) if the local 911 committees select all the urban alternatives provided in the planning manual.* There would be interim numbers--105 and 124-- of 911 systems if multicounty or county systems, respectively, are selected by the 911 committees.

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*A total of 334 911 systems would result if Cook County elected to use complete selective routing (124 systems -- see Section V-F).

Alternatives	Number of 911 Systems	Total Number of Personnel	Total Annual Personnel Cost	Added Cost of 911 Systems	
				Initial	Annual
Multicounty ISP 911 Systems with 28 City 911 Systems and 21 Subcounty 911 Systems in Cook, Du Page, and Lake Counties	64	581	$ 5,577,600	$1,909,500	$8,423,500
Multicounty 911 Systems with 66 County 911 Systems and 26 Subcounty 911 Systems in Cook, Du Page, Lake and Kane Counties	105	736	$ 7,065,600	$2,116,100	$6,290,400
County 911 Systems with 26 Subcounty 911 Systems in Cook, Du Page, Lake and Kane Counties	124	833	$ 7,996,800	$2,342,600	$5,947,000
Subcounty 911 Systems with 35 County 911 Systems	232	1,221	$11,721,600	$2,824,900	$4,907,100

Table 8

ALTERNATIVE 911 SYSTEM CONFIGURATIONS AND COSTS

C. Personnel Requirements and Costs

The two basic assumptions used for determining personnel were: 1) 911 service would be provided in single stage systems (one person does both call answering and radio dispatching) at each 911 answering point, and 2) all calls not directly dispatched at the 911 answering points would be transferred to the dispatch points of the other agencies in the 911 service areas.

Fewer personnel are needed in combined centers. Thus combined centers show an economy in scale of operations because of increased efficiency. The third column of Table 8 shows this effect. The 64 911 centers in the ISP alternatives (top row) are staffed by 581 personnel (about nine personnel per center), while the 232 subcounty alternatives (bottom row) require 1221 personnel (about five personnel per center). The staffing of the ISP alternative provides two to three personnel on duty at one time in each center, while the staffing of the subcounty alternative provides only one person on duty at one time in each center.

Thus, the use of multiple personnel in the 64 ISP centers increases efficiency so that the 581 personnel in these centers can provide the same levels of service as the 1,221 personnel in the 232 subcounty systems. This same effect can be seen in the two other alternatives: fewer total personnel are needed with fewer centers.

It is important to recognize that these personnel are performing 911 call answering, 911 call transfer, and direct dispatch. Thus, some number of these personnel would be needed regardless of whether 911 were implemented or not.

Thus, the number of personnel needed for these alternatives (and their associated costs) indicate potential overall cost savings realizable from consolidation, rather than the incremental costs of 911 over and above the current telephone and dispatch systems. Stated another way, the 232 911 systems of the subcounty alternative is much closer to the current public safety situation in Illinois than is the 64 911 systems of the ISP alternative. Cost savings in personnel of up to $6 million over the current situation would be realized by going to the ISP alternative.

The annual personnel costs given in column 4 of Table 8 show the personnel costs of the alternatives assuming a monthly cost of $800 per person. A comparison of the numbers shows that the ISP multicounty alternative will have personnel costs that are: 79 percent of the multicounty alternative, 70 percent of the county alternative, and 48 percent of the subcounty alternative.

D. Added Cost of 911 Systems

The last two columns of Table 8 contain estimates of the added cost of the 911 systems for the four alternative groups shown in the first column. Both initial and annual recurring costs are shown in the table. In this section, we will discuss the factors in these costs.

1. Initial Costs

Initial costs (column 5) are comprised of estimates of initial telephone company charges for telephone lines and call answering and transfer equipment plus the costs for logging recorders (to record each 911 call on magnetic tape). The costs of the logging recorders range from a low of about 80 percent of initial costs for the ISP alternatives to a high of about 90 percent of initial costs for the subcounty alternatives.

As discussed in the planning manual, an alternative means of operating these recorders (one per position rather than one per incoming line) could reduce the number required very significantly. Depending on the numbers of available channels on existing recorders in the dispatch centers (the channels would be used to record calls transferred from the 911 answering point), savings of up to a factor of 10 could be realized in the initial costs shown in Table 8. Because these cost estimates do not take into consideration the use of recording equipment that may be available in some centers, actual initial costs must wait for the evaluations of local public safety equipment situations by the local 911 committees.

2. Annual Costs

Annual costs are comprised of annual costs for additional personnel needed to provide 911 service and for telephone lines and call answering and transfer equipment.

a. Personnel Costs

The method used for estimating additional personnel requirements is discussed in Appendix B of the planning manual and is briefly summarized here.

First, the current number of personnel needed to provide 100 percent call answering and dispatch (in a single stage operation) for the largest law enforcement agency in a given 911 alternative was determined. This law enforcement agency was assumed to be the answerer of all 911 calls for the given alternative. Second, the additional work load needed to transfer calls to all other agencies in the given 911 alternative was determined; this work load was added to the work load for the largest law enforcement agency. Third, the combined work load was used to compute the number of personnel needed to provide: call answering for all agencies, call transfer for all agencies except the largest law enforcement agency, and dispatch for the largest law enforcement agency. If this combined work load required additional personnel, these were added to the cost of the alternative.

In effect, then, the number of additional personnel needed for 911 was determined by the capacity of the staff of the largest law enforcement agency in a selected alternative to absorb the workload created by 911 call answering and transfer for other agencies in the alternative.

The ability of an existing agency to absorb the additional workload is determined by two factors: 1) the extent to which the new workload is distributed across the existing agencies, and 2) the efficiency of the agency (correlated with staff size) that must answer the 911 calls. In the subcounty 911 alternatives, the workload is distributed very widely so that no additional personnel would be needed (based on the algorithm discussed earlier). In the county 911 systems, the largest law enforcement agency in a county would have to provide call transfer to all other agencies in its county, resulting in a need to add 67 personnel. In the multicounty alternatives, the effects of combining low population counties provided some economics of scale over county-only alternatives so that only 48 additional personnel would be required. Finally, the ISP multicounty alternative would require no additional personnel because of the efficiency of the large staffs already in the ISP districts.

b. Telephone Costs

The telephone costs in the additional annual costs of the 911 systems are for line and answering equipment charges. Both incoming 911 lines from the central offices to the public safety answering points (PSAPs) and outgoing lines from the PSAPs to the served agencies are included in these costs (these costs are documented in Appendix B of the planning manual). It should be noted that direct trunking was assumed for all incoming 911 trunks.

The primary factors in the costs of trunks are: a flat $20 per trunk per month charge for intraexchange trunks; a $25 per trunk per month charge for interexchange trunks; and a $5 per mile per trunk per month charge for interexchange trunks. These cost factors result in higher telephone line charges for 911 alternatives that include the larger areas requiring longer trunk runs, i.e., the small subcounty 911 systems will have lower telephone charges than the large ISP 911 systems.

E. Discussion of Alternatives

Each of the four alternative groupings shown in Table 8 has certain unique characteristics that will be described in this section.

1. Multicounty ISP 911 Systems

This alternative includes 15 ISP multicounty systems, 28 urban systems, and 21 subcounty systems in Cook, Du Page, and Lake Counties. It maximizes the gains of consolidation on efficient use of personnel by using three 911 positions in each ISP operated PSAP.

In each ISP PSAP, the answerers would continue dispatch of the ISP vehicles and provide call transfer to agencies or, perhaps, dispatch of other agencies' vehicles. Because of the current staffing of the ISP districts, there appears to be no significant need for additional personnel.

Because no additional personnel would be needed in the ISP districts, the entire annual cost shown in Table 8 is for telephone lines. The large geographical areas covered by the ISP 911 alternatives require long runs of lines from the central offices to the PSAPs and from the PSAPs to the served agencies.

We strongly recommend however, the investigation of alternative means of interconnecting the locations--e.g., bulk billed high density routes, concentrator-identifiers, state-provided channel service--because of: 1) the availability and professionalism of these district offices, 2) the potential for personnel cost savings in this alternative, and 3) the ability to provide high quality 911 service to rural areas.

2. Multicounty 911 Systems

The multicounty 911 system alternative combines 32 counties into 13 multicounty systems with most of the remainder of the state (66 counties) served by county systems (Cook, Du Page, Lake, and Kane counties have subcounty systems). Grouping of counties into multicounty 911 systems was accomplished on a population and proximity basis so that many low population counties were not included.

Multicounty 911 systems require more personnel than multicounty ISP systems because the county groups are smaller and because there are actually more individual county 911 systems than there are counties in the multicounty 911 systems.

The 48 additional personnel needed to augment the staffs in the PSAPs are less than for the county systems because of the increased efficiency of the multicounty centers. These additional personnel contribute $461 thousand to the added annual costs of this alternative with the balance of $5.289 million being for line and equipment costs. This is very close to the annual telephone costs of the county systems (see next subsection) due to the balance between more extensive line lengths in the multicounty alternative and more positions in the county alternatives. As with the ISP alternatives, we recommend investigation of possible alternative means of interconnecting central offices, PSAPs, and agencies in the multicounty case.

3. County 911 Systems

This alternative grouping consists of 98 county systems and 26 subcounty systems in Cook, Du Page, Lake, and Kane Counties. This configuration requires additional systems over the multicounty alternative with a concurrent need for more personnel. Because the county alternative places the 911 workload for a county on the largest law enforcement agency in the county, this alternative requires the largest number of new personnel.

This need for additional personnel occurs because many of the current county systems are just adequately staffed at the present time. Thus, the additional workload of 911 would make them unable to provide the required level of service. The 67 additional staff required for this alternative would have an added annual cost of $643 thousand with the remaining added cost of $5.304 million being for telephone lines and equipment.

The reduced annual costs of the telephone lines over the ISP alternatives are again due to the shorter line runs for this alternative. Note that the initial costs of equipment are increasing (fifth column of Table 8) as more and more 911 systems are added. This increase is caused by the additional logging recorders needed for the increasing number of lines.

4. Subcounty 911 Systems

This alternative contains 197 subcounty and 35 county 911 systems. The distribution of the 911 workload over 232 911 centers so dilutes the additional workload that no additional personnel are needed to provide 911 service.

The entire added annual cost for this alternative is for the monthly costs of telephone equipment and lines. Because the telephone line runs are so short, this cost is less than the telephone costs of the other alternatives. Increased initial costs are due to the need for more logging recorders to handle the many lines and centers.

F. Selective Routing Considerations

In the highly urbanized regions of the state, the use of selective call routing must realistically be considered as an alternative to interagency and interjurisdictional cooperation. This need is created by the problem of boundary mismatch between the telephone central office boundaries and the jurisdictional boundaries.

Appendix B of the local government planning manual contains an analysis of two selective routing alternatives for suburban Cook county. Using tentative initial costs of $2 per main station and 8¢ recurring costs per main station per month, costs were developed for using selective routing to partition the county by jurisdiction and by radio district.

Selective routing by jurisdiction (124 systems) would require an initial cost of approximately $2.4 million and a recurring cost of approximately $1.3 million. Selective routing by radio district (25 systems) would require an initial cost of approximately $930 thousand and an approximate recurring cost of $660 thousand. These figures should be compared to the costs of division by telephone boundaries (22 systems) of $187 thousand initial and $650 thousand annual. These latter costs were used in the previous cost analyses of this chapter.

It is particularly noteworthy that the annual costs for selective routing by radio district are nearly identical to the annual costs for the telephone boundary division. This is due to the fact that the annual costs of personnel and outgoing transfer lines in the telephone boundary alternatives are comparable to the added costs of the selectively routed incoming lines.

A local decision to proceed with selective routing will depend on a number of factors: the degree of cooperation among jurisdictions, state decisions on subvention, and local ability to pay added costs for selective routing. A brief analysis of Cook County indicates that careful use of selective routing (as the radio districts) in the highly urban areas can result in annual costs comparable to telephone boundary partitioning. The additional initial costs of selective routing could, perhaps, be absorbed over longer periods of time, if necessary.

G. Summary

The actual configurations of 911 systems in the state will undoubtedly be a mix of the system configurations described in this chapter. Initial 911 costs for system installation appear to be on the order of $2 million regardless of configuration unless the alternative logging recorder configurations are used, in which case the costs could be on the order of $750,000. Extensive use of selective routing will increase these numbers considerably.

Added annual costs of 911 are more difficult to estimate because of the range of costs of the alternatives and the many possible means of using existing telephone and dispatch personnel. Assuming that a mix of systems is implemented, an initial estimate of about $6 million per year for 911 seems realistic.

In the next chapter of this report, we discuss various ways that this money could be raised and provide a comparison of state and local finance of 911 systems.

VI FINANCING OF ILLINOIS 911 SYSTEMS

A. Introduction

Stanford Research Institute determined that one major concern of all local Illinois agencies and jurisdictions confronted with the necessity of implementing 911 is purely fiscal. They want to know who is going to pay for implementing and operating 911 systems.

Although local public safety agencies have traditionally been funded by local monies, there is much argument that 911 communications do not fit easily into this traditional role. Because 911 is to be implemented in response to state legislation, local agencies do not feel that they should have to carry the total financial burden. Although the majority of questionnaire respondents believe 911 will benefit public safety operations, not all are convinced of the cost-benefits of the system. Additionally, some local agencies believe that the chief beneficiaries of the system will be transients. Consequently, they feel that the state should provide supplemental funds for 911 systems, since the beneficiaries will not necessarily be local.*

In the light of this perception of 911 at the local level, the first part of this chapter will address the problems and benefits of two fiscal alternatives:

- Financing 911 from strictly local revenue
- State subvention financed by a statewide tax

In Section B, we will present a discussion of these fiscal alternatives and present arguments for and against the various funding alternatives. Section C presents a variety of funding mechanisms for both initial and recurring costs. This is not intended to be an exhaustive list of state and local taxes; we are only presenting some of the more logical sources of funds. No one funding source can be considered

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*The Local Government Planning Manual contains discussions of the costs and benefits of 911. These discussions should persuade local agencies and jurisdictions of the general value of 911 to Illinois citizens.

optimal, but some are clearly more applicable to 911 financing than others. At this point, we are primarily interested in generating the state and local discussion needed to develop an adequate and equitable funding mechanism.

B. Funding Alternatives

1. 911 Funding on the Local Level

There are several rationals advanced for placing the burden of 911 cost on local rather than state tax bases. First, local governments have traditionally paid public safety communication costs as part of police and fire protection budgets. Although this is not a highly visible item in budgets (being 'buried' in various places), local governments are still paying these costs in almost every instance. Both tradition and custom point to local funding for communications costs. Further, it is argued that this is the best way to ensure that local governments do not develop unnecessarily sophisticated 911 systems, which can be a temptation if the state guarantees total payment for 911.

Local funding insures economical resource utilization and relieves the state of the responsibility for developing a subvention plan, since state agencies need not enter the funding picture at all. From the local standpoint, such an arrangement insures minimal state interference in their communication systems.* As a matter of precedent, all 911 systems which are already in operation are paid for out of local revenues.

In a local funding situation, the communications costs would be divided between participant agencies. Existing 911 systems are funded in two basic ways. First, in jurisdictions with no municipal fire or ambulance district, a city can pay the bill in one of two ways. Either it can simply budget the 911 costs as part of police expenditures for the city, or the city clerk can pay the bill directly. In both situations, the local government has assumed direct responsibility for supplying 911. Second, where more than one tax district is involved, as in cities with a fire district supported by its own tax base, some method of dividing the cost must be developed. In Illinois this financing of 911 has taken two basic forms. Either the agency with the 911 answering point charges other users a flat rate, or user agencies pay in proportion to the number of calls received. For example, if the fire department received fifteen percent of the 911 calls, it would pay

*State public safety agencies must, of course, participate in the local systems.

fifteen percent of the annual cost. The first form may be called fixed fee, the second, cost sharing.

Although the first funding method (with the city paying the bill directly) is used in many existing systems, it does suffer from severe limitations. It can be implemented in areas where a local government agency which encompasses the entire area to be served is willing and able to assume total responsibility. If there are multiple jurisdictions involved, a more complex funding method must be used. Consequently, we expect that most systems developed in response to HB911--if funded locally--will be funded through either cost sharing between participants or by a fixed fee paid to the agency which answers 911 calls. It is also possible that some combination of the two forms could be used, with major participants in a system paying a proportion of the cost, and agencies that receive occasional calls paying a flat rate.

As an example of possible cost sharing, assume a sample county with a population of approximately 25,000. It has three municipal police departments and a sheriff's department, with the sheriff serving municipalities that do not have their own police departments. In common with the rest of the state, our sample county receives law enforcement service from the Illinois State Police (ISP). In addition, there are several fire districts and a municipal fire department in the main town. Given this typical configuration, one agency which would have jurisdictional scope sufficient to provide all 911 communications would be the county government (the ISP is another alternative). The county has the only tax base covering the area to be served. Funding by the county would, of necessity, imply that they would run the system.

In the case of subcounty or multicounty systems, some other method of finance would have to be used. A means of distributing the cost among various public safety agencies would have to be developed, and adjustments for boundary problems within the county would have to be made. Cost considerations become immediately more complex in such systems and any funding mechanism would have to allow for this increase in complexity. In addition, if funding is done at a subcounty level it can cause an unequal tax burden. If a citizen lives in an incorporated area with a separate fire district, he could be taxed three times for the same service. The county, city, and fire district all depend on property tax as a major source of revenue, consequently they would all be forced to use this tax base for their contribution to 911 system costs.

To date, most 911 systems in Illinois cover one or, at the most, two municipalities. Their funding problems are, therefore, relatively minor compared to the county-wide systems favored by many respondents to our questionnaires. These existing 911 systems generally had favorable boundary matches with the telephone service areas and their proponents felt that the benefits of 911 were worth the cost to their area. The systems were implemented from the grassroots in each community.

Now that 911 has been mandated state-wide, localities which previously had felt that 911 was not worth the cost, are placed in the position of having to implement 911 systems. That is, areas which perhaps cannot easily afford 911 will have to develop it anyway. This can result in a severe burden in some areas of the state if the responsibility for funding 911 is placed solely on local governments. In Florida, we found that the more rural, thinly-populated counties would be most burdened by 911 costs. Since many Illinois counties have this characteristic, it may be hypothesized that the Florida conditions would be repeated here. For rural areas, implementation of a 911 system could result in sharp property tax increases or a steep rise in telephone costs. Either of these results would create an undue hardship for local residents who ultimately pay the bill. In the light of these considerations, an alternative to local finance should be considered.

2. 911 Funding Through the State

The major alternative to locally financed 911 is some form of fiscal assistance from the state. Because the Illinois state government has access to more tax instruments than the local governments, it has the capability of distributing the tax burden in the least regressive manner. As all citizens will enjoy equal benefits from 911, it would be inequitable for some to pay more for the same service. Since all areas will have to maintain 911 systems and some areas will be more heavily burdened by this system, equity of cost can be increased by equalizing the cost across the state. The 'public interest,' described in HB911, encompasses the State, so citizens should contribute equally at the state level.

It can be argued that state assistance in this matter would lead to uneconomical system development, since local governments would have no incentive to develop efficient systems. This possible effect can be mitigated by an efficient subvention schedule which can be modeled after federal revenue sharing and grant programs. Such a schedule

could strive for the following three objectives (if these are found appropriate by Illinois officials):

- Compensation for the unequal fiscal positions of the local governments participating in a 911 system by providing support of all recurring costs in proportion to the difficulty experienced by the local governments in financing 911 with local revenue.

- Encouragement of efficient and economical design and management of a 911 system by always requiring some local participation in meeting recurring costs.

- Encouragement of regionalization of 911, where appropriate, to provide both economies in operation and better emergency services for the public.

The third objective can be achieved by offering a higher subvention rate to those areas which achieved the highest level of consolidation.

The subvention schedule can be developed to provide a portion of the cost of basic 911 systems throughout the state. Those areas that want to develop a more sophisticated system, and have the fiscal resources, would be able to do so by providing supplementary financing. At the same time, poorer areas of the state can satisfy state standards without any undue local hardship. All areas would be able to meet state standards; those which wished to exceed them (at their own expense) could. This subvention formula will allow the state to provide a needed service to its citizens without supporting unnecessarily elaborate operations. Implicit in this approach is the development of an acceptable description of a 'basic' 911 system (see proposed system standards in the Local Government 911 Planning Manual), including its fiscal, organizational, management, and operational characteristics.

A technique for subvention scheduling developed by SRI is presented in Appendix C. We recommend that it be used to develop a subvention program for Illinois. Briefly, it apportions a given amount of statewide support among the 911 systems within the state on the basis of population served and assessed valuation per capita. Thus, it is based on the number of citizens served and their comparative ability to support such a system. The fraction of state support is thus variable; a 911 system serving an area of high population and low assessed valuation per capita (i.e., it has little ability to pay) will receive maximum support. An area of low population and high assessed valuation will receive minimum support.

A small system with a high per capita assessed valuation can increase the amount of state support it receives by joining with another area, thereby increasing the population served by the 911 system.

Such a formula encourages consolidation and discourages fragmented 911 development. If an area felt that the price of their own system was within reason, they would not be forced to consolidate. Areas where such a system was unacceptably expensive could consolidate to gain maximal support. This formula thus provides the state with an ability to balance various demographic and fiscal factors for the purpose of equitably distributing state-collected funds.

Legislative intent regarding potential subvention of 911 is not completely clear. HB911 states:

> "In December of 1979 and in December of 1980 the Commission, with the advice and assistance of the Attorney General, shall submit recommendations to the Bureau of the Budget and to the Governor specifying amounts necessary to further implement the organization of telephone systems specified in this Act during the succeeding fiscal year. The report specified in this paragraph shall contain, in addition, an estimate of the fiscal impact to local public agencies which will be caused by implementation of this Act." (Sec. 13)

This section of HB911 indicates that the State will not make any final decisions about the nature and extent of State aid (if any) until it has an idea about the fiscal impact of 911 at the local level. Consequently, the question of subvention is an open one until after the Commission completes its research into the problem. However, it is certainly not too early to address the questions raised in this section, or to consider the various sources of potential revenue presented in the next section.

SRI would like to stress the relative strength of potential opposition should the state fail to make some provision for fiscal assistance to the local communities. We determined during the course of this study that there is a strong local consensus that such assistance should be forthcoming since the 911 program is state mandated. If no assistance is granted, considerable local resistance may be expected.

C. Sources of Funds

There are a substantial number of potential funding mechanisms for 911. For the purpose of this discussion, they will be considered as appropriate for either initial or recurring costs. Of the two, recurring costs present the larger problem, since they must be paid annually.

The basic question to be resolved by state/local interaction is who will pay how much of both initial and recurring "bills." In the previous subsection, we addressed state and local factors that must be considered in determining whether the state should subvent 911 funds. There was no discussion about the state and local sources of the funds. Consideration of various potential funding mechanisms is provided in this subsection to demonstrate both that the state has access to more sources of income and that it would be able to distribute the financial burden so that no one tax is disproportionately increased.

The following discussion looks at a variety of funding sources, but we do not recommend that any one of them necessarily carry the total 911 burden. It is possible that 911 could be implemented and operated in the state with no tax increase at all. However, if a tax increase is necessary, the following techniques would be "reasonable" for raising the additional funds. All of the funding sources below are considered in terms of flexibility, equity, efficiency, and administrative structure.

A flexible funding mechanism is one that automatically reflects changes in the economic environment so that the rate which produces enough revenue in 1976 will still be adequate in 1986. Equity in financing is important in that 911 should impose a socially acceptable financial burden on everyone. Equals should pay equally and unequals should pay in relation to their ability to pay. In short, the financial burden whould not be regressive. Efficiency may be defined as the proper use of resources. A tax or pricing policy is efficient if it encourages proper use of 911 and inefficient if it encourages overuse or abuse of the system. Administrative considerations and effectiveness focus on the mechanisms necessary to collect and disburse the funds and the costs surrounding these mechanisms. These costs must be considered as part of the price of the system. Additionally, each source of recurring funds can be classified as appropriate for state or local collection.

1. Sources of Initial Funds

a. State or Local Borrowing

This is a method commonly employed by state or local governments who wish to finance capital improvements. It takes a variety of forms, but always involves either long or short term debts which are serviced by increases in the tax rate or base. The effect is to increase the annual cost by a certain percentage until the debt is removed. Many states have statutory limitations on the amount of indebtedness which may be incurred, and many require prior consent by the electorate.

If local governments pay the initial costs, this system of finance might prove problematic (although funding alternatives exist), since it is possible that some areas have already reached their debt ceiling. If the state utilizes this mechanism, the total cost of all systems would be distributed across the state and some systems would be 'subsidized' by other areas. However, this distribution can be justified by the fact that all citizens of the state will benefit equally from the service, so that the financial burden should be equally dispersed. Although state or local indebtedness has several disadvantages, it is one funding mechanism which is controlled by the government that wishes to generate funds.

b. Federal Funding Sources

The feasibility of financing 911 communication systems with federal funds is constrained by the availability of programs within the current structure of federal grants in aid. Because the federal government does not generally obligate itself to the continuing support of a program, federal grants cannot generally be used for recurring costs. In addition, federal agencies are generally reluctant to finance projects where the primary beneficiaries are local.

Although programs for public safety (and hence 911) have some of the characteristics of classic public benefit and consequently deserve some federal attention, most of the benefits accrue to the residents of local jurisdictions and the rationale for local or state support of public safety functions is traditionally strong.

However, some federal monies may be considered as possibilities for implementation costs of 911 systems as a part of general improvements in emergency communication. These monies are most likely to be Law Enforcement Assistance Administration funds and Emergency Medical (DHEW) funds. In addition, revenue sharing could provide some funds since it is not subject to federal constraints.

Revenue from the federal government is distributed to state and local governments each year under the Federal Revenue Sharing Project. These funds are not earmarked, and can be used for any state or local project, consequently they could be used to support a 911 communications system. However, these funds have generally been the focal point of a variety of competing uses; to date, they have not grown very quickly. In addition, 1976 is the cut off date for the old program, and the shape of any new program is not clear. Any available funds could certainly be used for initial costs, but it may be unwise to depend upon revenue sharing for continuing support.

The Federal Law Enforcement Assistance Administration (LEAA) was authorized by the Crime Control Act of 1973 to distribute funds to state governments for programs preventing and controlling crime. The great bulk of action funding is in the form of block grants to states. These grants are distributed through State Planning Agencies (SPAs); the SPA for Illinois is the Illinois Law Enforcement Commission. At this writing there is no LEAA guideline restricting funding of 911 systems, so 911 can be considered a program eligible for LEAA funds. Since the 911 system is a component of a broader public safety system that this agency is empowered to support, LEAA funds can only be provided for changes directly connected to law enforcement. Because of federal policy, this money could only be used for initial development and implementation; it would not be available for ongoing support

The Emergency Medical Services Act passed in 1973 also provides some limited funds for 911 development and implementation. According to the act, 911 is one element of an optimal emergency medical response system. On this basis, some money should be available for implementation and development. It should be remembered that the amount of money available in the past from this source has been relatively small, so this should not be viewed as a major source of funding. It is most often granted on a state or regional basis.

2. Sources of Recurring Funds

a. The Property Tax

Property tax is a possible source of recurring funds for 911 communications systems. It could be collected at the county level, and would require no new administrative mechanisms or costs. This tax is particularly appropriate if local agencies must meet some portion of 911 costs, since it is a major source of locally-controlled revenue. In addition, most local public safety agencies and programs are currently supported by property taxes, so there is strong precedent for its use.

However, there is some doubt as to the relative equity of property tax being used for this purpose. Some economists maintain that property tax is regressive because it fails to consider any economic index other than property ownership. Consequently, the burden falls as heavily on the poor property owner as it does on the wealthy owner, so that they are burdened unequally. Other economists maintain that since the property tax pays for public services which mostly benefit property owners, the tax is not regressive since it is on benefits received. Its relative equity in these circumstances is not clear, and both arguments should be considered.

With regards to efficiency, the property tax would constitute a hidden charge, which would probably not affect the public's use of 911. There may be problems with its flexibility, however. Although approximately fifty percent of Illinois' population is classified as urban, this urban population is concentrated in relatively few areas within the state. Most of the state is still fairly rural. As a general rule, the assessed valuation in rural areas does not grow quickly, and the revenue from the property tax is not particularly flexible. In addition, there are limits on the rates that many local jurisdictions can levy.

Under these conditions, the cost of 911 would have to be absorbed by a relatively fixed tax base, creating a situation where rate adjustments might be frequently necessary if the cost of 911 were to increase more rapidly than the tax revenue. In addition, the cost of a 911 system could create a severe burden in some rural areas with a relatively low assessed valuation, particularly where they are approaching their tax rate limit.

b. The Sales Tax

Sales tax is a possible source of statewide funds for 911 communications. Since monies from the sales tax are already being redistributed to both city and county governments, no new administrative mechanisms would be required. However, it is likely that a new formula would have to be developed for 911 subvention.

The current practice of returning a percentage of the money collected in each jurisdiction by sales tax would not necessarily correspond with the cost of 911 in that area. For example, a rural jurisdiction could have a low volume of sales (since most of the populace might shop in adjoining areas), yet the cost of their 911 system might be relatively high.

Thus, although sales tax is probably flexible enough on a state-wide level to fund 911 communications without constant rate adjustments, funds collected by it would have to be redistributed on the basis of need. In addition, the sales tax is somewhat regressive; any sales tax support for 911 would be regressive as well. Since there is little correspondence between use of 911 and payment of a retail sales tax, no argument about benefits received can offset this basic inequity. This tax would have little effect on the frequency of 911 calls, since the cost would not be associated with the call by system users. Thus, it would not affect the efficient use of 911.

Since Illinois is one state which requires legislative approval for sales tax increases, there could be some difficulty in obtaining an increase. This would be particularly true in a political climate where any increase of such a visible tax would be resented by the populace.

c. The Income Tax

State-administered income tax is another potential source of funds for 911 communications. It would be collected by the state, and a method of subvention would have to be developed. There would not be any new administrative costs, except those necessary to administer the subvention schedule. Income tax is inherently more equitable than property or sales tax, since it takes into account variations in income. That is, it is the least regressive existing source of funds. If we assume that all residents will benefit equally from the improved access to public safety services, then income tax is an equitable method of financing 911.

It would be efficient as well, since such a hidden tax is unlikely to affect 911 use. It would also probably be sufficiently flexible, as income tax reflects growth in the economy. Consequently, few rate adjustments would be necessary except in the case of a recession. However, there has been strong resistance to income tax increases in the State of Illinois, and any such increase would have to pass the state legislature. This could make income tax untenable in spite of its potential value, since many legislators would be reluctant to vote in favor of such an unpopular item.

d. The Telephone Excise Tax

An excise tax on telephone usage is another potential source of 911 support. It has the advantage of a clear coincidence between system benefactors and beneficiaries. Citizens without a phone, and consequently with limited 911 access, would not contribute to the system.

The current federal excise tax on telephone use is gradually being phased out at a rate of one percent per year. Telephone companies routinely collect this tax and forward it to the federal government, so no additional administrative mechanism would be required. It would require some modifications to the existing collection technique, since the tax revenue would have to be forwarded to a new place. It seems logical that the state of Illinois could levy some percentage of this tax and use the revenue to support 911 communication systems. By replacing a federal tax with a state tax, no new burden is placed upon the citizen; the tax is already being collected and used for a different purpose.

In other areas we have studied, we have found that a one or two percent telephone excise tax would be more than adequate to finance 911, and since telephone use is increasing, it is probable that this tax would prove sufficiently flexible as well. It has been argued that by retaining a portion of this tax, the state of Illinois will be making telephone service less accessible to its citizens. This is a judgement that the state must make, with the understanding that the tax is already included in the bill. If it is making telephone service less accessible, such an effect is already present. Historically, the federally imposed excise tax has varied from three to ten percent. It is possible that the federal government could reinstate this tax at a later date, and the citizens of Illinois would under these circumstances be paying slightly more than the average. However, since the state is already taxing telephone use, any attempt to reduce the tax burden of telephone users would have to include a reduction in existing taxes as well. Again, this is a judgement the state will have to make.

Although this tax is somewhat regressive, this regression is modified when the total bill is taxed, as telephone usage tends to reflect users' incomes. Since such a tax would not be connected to individual calls for assistance, it is efficient. It would require state legislation, but not the imposition of a new tax. A subvention schedule would have to be developed, but this problem exists with all state collected taxes.

c. Public Utilities Tax

Another major contributor to the Illinois General Fund is the public utilities tax. This differs from all preceding taxes in that it is not directly levied on the citizen, but rather on the suppliers of electricity and gas and the transmitters of messages within the state.

This tax would be relatively regressive because rate increases to accommodate 911 would not be correlated with the income of the customer. A wealthy customer would pay no more than a poor one. In addition, it is relatively inequitable because gas and electricity usage are not related to 911 access. Thus, even those people without phones would pay for 911. This mechanism would probably be sufficiently flexible to support the ongoing 911 system costs, and it would not require any new administrative structure. It would, in common with all state-collected taxes, require a subvention formula.

There are advantages to this tax. It is currently a major contributor to the state general fund, and its proceeds support the ICC which is charged with 911 development and implementation. It does tax telephone utilities, and as a result is more linked to 911 access than the general sales tax or the property tax.

D. Conclusions

In this section, we have compared state and local funding of the 911 systems to be implemented under HB911. We have shown that local funding would create an unequal financial burden on the state's citizens with rural county 911 systems putting potentially heavy financial burdens on their citizens. Conversely, we have shown that state subvention of some 911 costs could equitably distribute these costs across citizens. A subvention formula is provided in Appendix C . By use of this formula, the state can accomplish three things:

- Encourage the development of larger 911 systems
- Provide the most financial aid to the neediest areas
- Encourage cost-effectiveness by leaving part of the costs on the local tax base.

A discussion of potential state and local revenue sources indicates that the state has the necessary tax instruments to provide the subvention, while local jurisdictions must rely on property tax only. The state should clarify its position on subvention as it obtains actual 911 system costs (as developed by the 911 planning process).

VII 911 SYSTEM MANAGEMENT ALTERNATIVES

A. Introduction

No matter which form of 911 system management is selected by local agencies, it must be accountable to three main groups:

- To the Illinois state government for compliance with guidelines and state standards
- To user agencies for the level of service provided to the agencies
- To state citizens for the levels of service provided to the citizens.

The accountability of the last two elements is interdependent. When citizens call for assistance from public safety agencies, they want courteous and effective responses with minimal delays. If this is not provided, the citizens will complain to the agencies. Since 911 answering centers will become the initial contact points for the citizens, user agencies are understandably concerned that this answering center enhance their image. They want accurate, quick action from whomever answers the phone. If it is not rendered, they fear that the image of their agency will suffer. This is of major importance to any local agency which must have someone else initially take a call, and is one of the reasons for local concern about 911.

Aside from these general considerations, 911 system management will be affected by the social and political environment of various areas within the state. In some areas, it may be best for an existing agency to assume responsibility for 911, while in other areas, 911 may be better provided by a neutral communications division of local government. Some areas prefer joint powers agreements as working arrangements; others feel that this type of agreement is unnecessary and wish to use contracts.

In this chapter, we will discuss existing 911 management forms, and review management preferences which appeared in the questionnaire. (A full discussion of the questionnaire appears in Section III.) We will also present a discussion of joint powers agreements and contractual arrangements. This discussion will emphasize their applicability for different situations, as well as safeguards assuring accountability. We will not discuss special districts as a form of 911 management, because it was not generally favored by the agency representatives that were surveyed.

B. Existing and Preferred 911 Management Alternatives

The majority of existing Illinois 911 systems are operated and managed by agencies which existed prior to implementation of 911. No new communications systems have been developed specifically to operate 911. Rather, 911 is operated in these areas by the largest law enforcement unit of the jurisdiction which decided to install a system. The 911 lines were simply added on to their previous communications. Most of these 911 operations cover a single jurisdiction, generally a municipality.

Management is fairly simple in these cases; the operating agency contracts with other major agencies to answer 911 calls and either dispatch the other agencies, or convey the information by call relay or transfer. The call-handling varies from system to system, but the general pattern is the same. These systems are characterized by informal rather than formal agreements. Although they may have a joint powers agreement (in more complex situations) or a contract, most of the interaction between system providers and system users is informal. In no case did our survey identify a specifically-designated "grievance committee" or operating committee which met on a regular basis. Rather, problems and issues of concern are handled informally through the existing structure. If the director of communications cannot resolve a problem, it goes to the chief --if he cannot resolve the problem, it goes to the city/county government. The operating agencies did not feel that there was any need for a more formal system; any major difficulties could generally be resolved by a meeting with all concerned individuals. None of the existing systems felt that special sanctions were necessary.

Although this pattern of 911 system management works well in existing systems, it is unlikely to be sufficient for systems evolving in response to HB911. All existing systems were developed and implemented in areas where there was a long history of cooperation, or at least no history of antagonism, between the providing agency and the user agencies. It is unrealistic to expect that this situation will be repeated throughout the state. Rather, we may expect that there may be many areas where rivalry between local agencies is common. Existing 911 systems were developed in response to a local desire for such a program--see Figure 4. Thus, there was ready-made local support for the program, and there were individuals who were committed to 911 implementation. It is unlikely that this pattern will be repeated in portions of the state which are developing 911 solely because it is mandated. This has produced a new implementation pattern--see Figure 5.

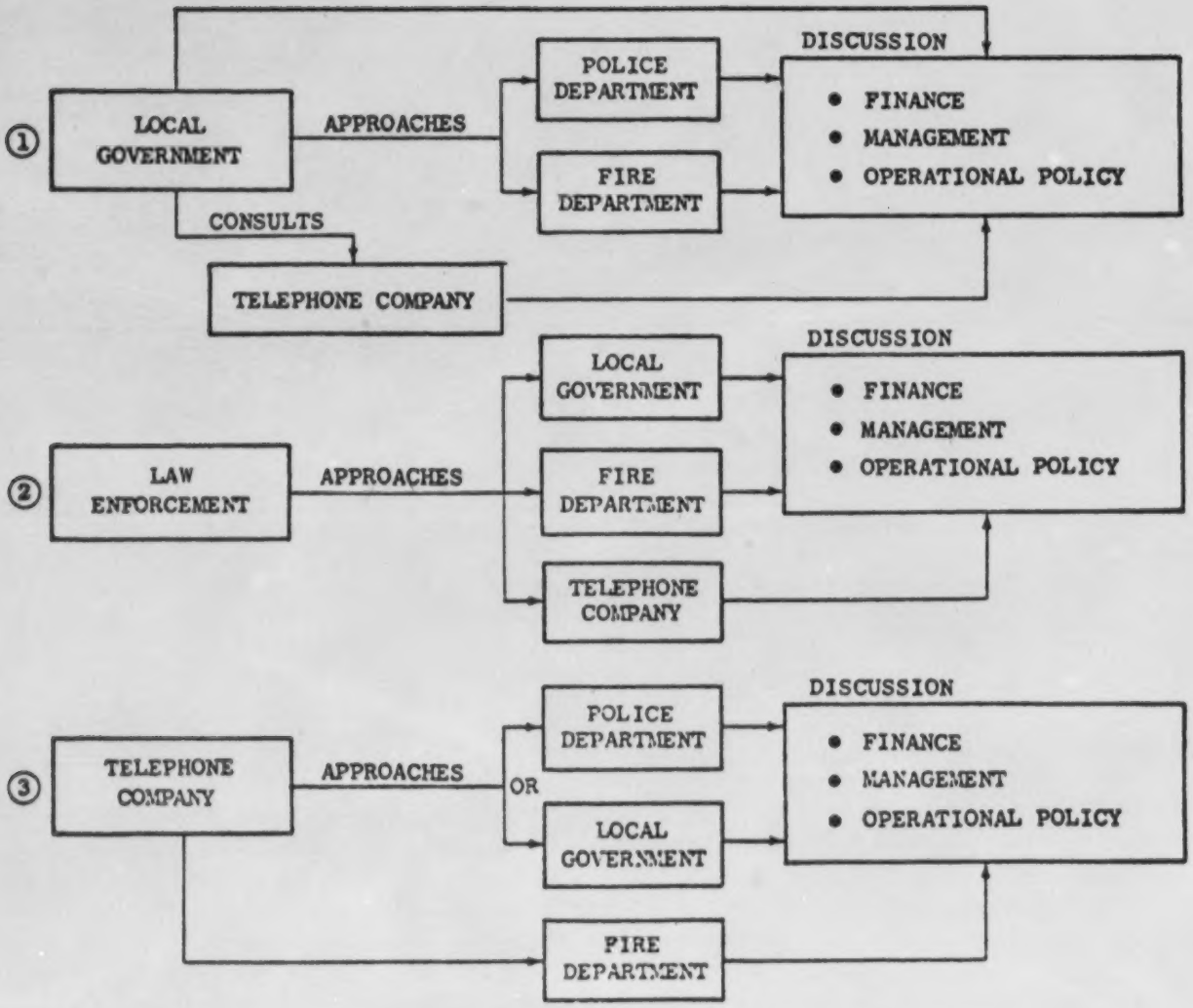
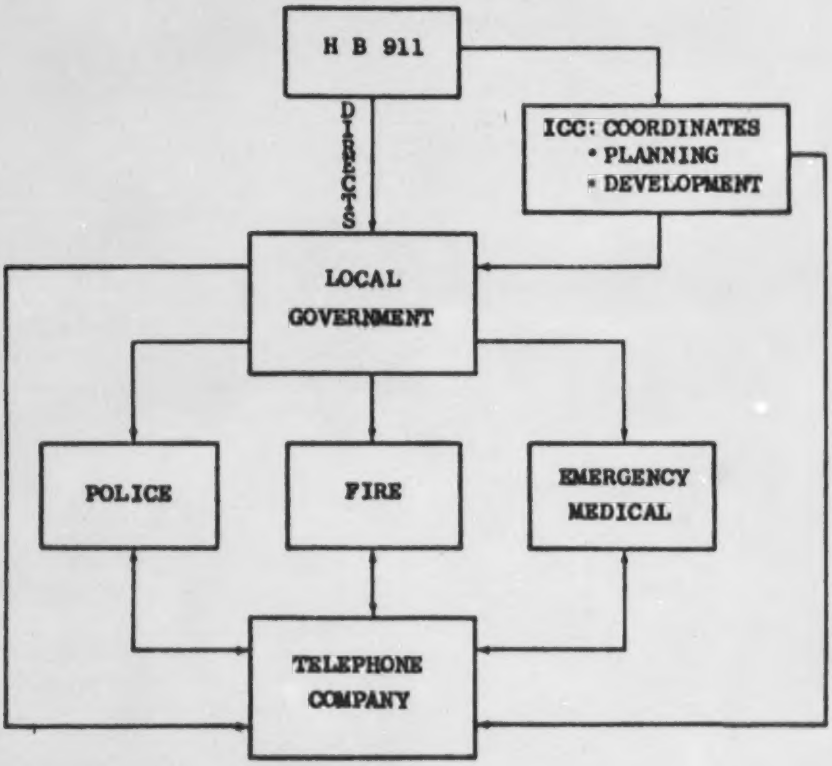


FIGURE 4 CURRENT ALTERNATE PATTERNS OF 911 IMPLEMENTATION IN ILLINOIS

FIGURE 5

STATE DIRECTION OF 911 DEVELOPMENT



This admittedly simplified diagram of a complex intergovernmental process shows that state-mandated implementation necessarily involves more agencies and is consequently more complicated than the previous system implementation.

Thus, we postulate that existing management forms will not be adequate for many of the 911 systems which will develop in response to state law. Many areas are characterized by a complexity which makes informal agreements inoperable; more formal patterns will have to be developed. To determine which management techniques would be most acceptable to local representatives, we distributed the questionnaire which was discussed in Chapter III. We found that 59% of all respondents favored joint powers agreements and 32% favored contract agreements. Only 9% favored the formation of a special district. This is not surprising, since the first two management forms are commonly used by local government. However, experience indicates that any agreement to implement and operate a 911 system must cover basic management matters specific to 911.

Before beginning a specific discussion of the two basic management forms, we would like to emphasize the importance of early discussion and interaction among potential participants of the system--see Planning Manual discussions. This was cited as a major factor in the successful development of existing Illinois 911 operations. The one Illinois 911 system where this did not take place is characterized by severe underutilization. Regardless of the final management form, it should be at least conditionally acceptable to all users of a 911 system.

C. Basic Management Forms

1. Joint Powers Agreements

As is indicated by existing forms of 911 management in Illinois, the joint powers agreement is most applicable in areas where there are two or more local governments with roughly the same resources. For example, if there were a county with six equivalent municipalities having their own police and fire service, and the county was willing to assume responsibility for 911, they would probably find that a joint powers agreement between all cities and the county would be optimal.

The county and cities would create a policy board of representatives from each participating government. This policy board would collect and disperse operating funds, make overall policy decisions, and hear grievances. Such a management form would eliminate the possibility

that any of the governments could dominate the system. Actual interagency operating policy would be developed by a representative committee of user agencies who would determine how calls should be handled, what levels of service were to be provided, and other actual operating policy. In essence, the joint powers agreement creates a separate communications authority; even if the actual physical plant is located in an existing agency's communications facility.

As is implied in the description, the joint powers agreement is particularly valuable in defusing a politically volatile situation. It provides an alternative to simple management by existing agencies, as well as a "neutral" control of resources. It also provides clearly identifiable agencies which are accountable to the state, public safety agencies they serve, and the local citizens. That is, there is a specific place for complaints about weaknesses in communications service.

In order to promote the acceptability of a joint powers management plan, several subjects should be carefully addressed by any area wishing to develop this form of 911 management:

- Any cost-sharing mechanism to determine user contributions should be based on some neutral criteria such as population served, volume of calls per month, or size of original communications budget.

- Continuity of funding should be written into the agreement, so that each agency's contribution is automatic. This might be accomplished by having both cities and counties dedicate a portion of their tax rate (determined by their total contribution), with the revenue paid directly to the 911 system.

- The prerogatives and obligations of signees should be clearly specified in the document itself, as should the prerogatives and obligations of the 911 communications system. This will reduce ambiguity and disagreement after the system has been implemented.

- Grievance procedures should be clearly stated, and open to users and providers equally. Any invokable sanctions should be clearly described. The form of these proceedings should be publicized and easily accessible to all concerned.

- Levels of service to citizens and user agencies should be stated in the document to eliminate ambiguity and establish basic response criteria. These levels of service must also meet statewide standards.

2. Contractual Agreements

Contract management of emergency communications is probably the simplest and most straightforward management form. It is most feasible in areas where there is one acknowledged agency with the capability to operate a 911 system, or where other major agencies in the area agree that an acknowledged primary agency should operate 911. This choice can be based on a variety of criteria. For example, logical choices would be the agency with the largest served population or the one with the most advanced communications capability.

Alternatively, if county-wide funding is chosen as a financial mechanism, and the county is willing to assume responsibility for all emergency communications, the sheriff or county communications division (if any) could be the provider. Responsibility for providing 911 would be placed on an existing agency, and funds would be handled through local channels. Contractual arrangements can also be financed by a set fee or a proportional fee. In this case, the providing agency essentially bills users directly through some pre-established formula.

Although contract management is a simpler management form, it has more potential problems than those inherent in the joint powers agreement. If the provider agency is viewed with any suspicion by potential user agencies, it may be extremely difficult to reach any consensus on operations and policy. In addition, there are more potential problems about operating policy and levels of service. These may be difficult to resolve if the contract form has inadequate provision for user input. Even in an area where local agencies have historically worked closely with each other, these sorts of issues can arise.

The following are some considerations which should be thoroughly discussed by all participants and written into the contract:

- The billing criteria must be specified in the contract, and should be unalterable unless a new contract is drawn and signed. This will eliminate user fears that the bill will arbitrarily grow. If the provider agency undertakes to finance the system, that should also be clearly stated.

- A user board should be established to develop and monitor operating policy and levels of service. It should have clearly defined recourse if the contract agency does not meet agreed-upon criteria.

- All operating policy and levels of service should be signed by contractor and contractee so that both are aware of the liabilities and prerogatives of their positions.

- The contract should provide for a grievance procedure which is accessible to user agencies, and which has the authority to enforce provider compliance in cases of need.

- A provision for an annual user review should be written into the contract to provide an official forum for discussion apart from the user board.

3. Joint Powers and Contracts--A Comparison

In conclusion, we would like to reiterate the major difference between 911 system management by joint powers agreement and management by contract. These differences focus on the location of fiscal control and responsibility for the provision of service and are shown in Table 9.

Management by joint powers agreement provides a new line of authority for emergency communications. The Policy Board formed by the agreement is ultimately responsible for provision of service, and has fiscal control of the communications system. Since the Policy Board is composed of user representatives, all participant agencies have input at the very highest level.

In contrast, the management by contract utilizes pre-existing agencies. Fiscal control and responsibility for provision of service are given to an agency which is already providing services in the area. There is no new communications authority, and user agencies do not have the built-in input that is possible with a joint powers agreement.

Table 9 COMPARISON OF JOINT POWERS AND CONTRACTS MANAGEMENT

MEASURES	JOINT POWERS	CONTRACTS
Applicability	Areas with equivalent minicipalities or agencies	Areas where one agency is acknowledged leader
	Valuable in a politically volatile situation	Most straightforward management form
Authority	Policy Board	Existing agency
Fiscal Control	Policy Board	Existing agency
Provision of service	Policy Board	Existing agency
Operating Policy	Users committee	Users committee
Grievance Procedures	Formal through Policy Board	Must be set up with contract
Levels of service	Policy Board	Must be set up with contract

VIII ROLE OF THE ICC IN THE DEVELOPMENT AND MANAGEMENT OF 911 SYSTEMS IN ILLINOIS

The Illinois Commerce Commission (ICC) has been given the added responsibility by the Illinois General Assembly of ensuring that the purposes of Public Act 79-1092 (HB911) are carried out within the time frame specified in the Act. This is a tremendous responsibility because HB911 will impact on the safety and property of all citizens and inhabitants of the State. The exact responsibility and authority vested in the ICC by HB911 are not clear in each case where the ICC is mentioned in the Bill.

In this section of the report, we discuss the ICC's role both in the local 911 system planning process and in the period following implementation. We will also discuss the ICC staff requirements that are necessary for the ICC to fulfill its duties in regard to HB911.

A. Three Roles of the ICC

HB911 refers to the ICC a number of times and leaves no doubt that the ICC, with the advice and assistance of the Attorney General, is responsible for the statewide 911 program. The law places the ICC in three different, but highly interrelated, roles in regard to 911 in Illinois--two roles that relate directly to local officials and local 911 systems, and one role that relates to the overall statewide view of 911. The two local roles involve the local process of 911 system planning and implementation (preimplementation), and the period after a local 911 system is in operation (postimplementation). The statewide role involves the formulation of recommendations and reports to be made to the General Assembly, the Governor, and the Bureau of the Budget.

1. Preimplementation Role

Table 10 shows the time table, as mandated by HB911, for the planning and implementation of 911 on a statewide basis. Two primary dates are January 31,1980 and January 31,1982. All public agencies must submit tentative plans for their 911 systems no later than January 31,1980. Final 911 system plans must be filed and arrangements for implementation made with the telephone companies no later than January 31,1982. Local agencies do not have to wait until December 31,1985 to put 911 into operation. Indeed, most of the 911 systems in the state will probably be put into service several years before this final deadline.

Table 10

HOUSE BILL 911 TIME TABLE

July 1,1975	--	Act Took Effect
September 25, 1975	--	HB911 Signed Into Law
February 16, 1979	--	ICC Progress Report to General Assembly
March 1, 1979 & Every Even-Numbered Year	--	Telephone Company Reports to ICC and General Assembly
December 31, 1979	--	Technical and Operational Standards Established by ICC
December of 1979	--	ICC Recommendations to Bureau of Budget and the Governor
January 31, 1980	--	Tentative Plans Submitted by Public Agencies
December of 1980	--	ICC Recommendations to Bureau of Budget and the Governor
February 16, 1981	--	ICC Progress Report to General Assembly
January 31, 1982	--	Final Plans Submitted by Public Agencies
December 31, 1985	--	Implementation Completed
	--	Coin Phone Conversion Completed
January 31, 1987 & Each Succeeding Year	--	Annual Public Agency and Public Safety Agency Agreements Filed

The first duty of the ICC is set forth in Section 7 of HB911:

> "...the Commission shall establish a general overview or plan to effectuate the purposes of this Act within the time frame provided in this Act."

The ICC is in the process of partially fulfilling this requirement by having SRI perform the study that is now complete. The results of our study provide a general overview, guidelines, and alternatives for the implementation of 911 on the local level. The final decision of exactly what form a local 911 system should take is up to local level officials and agencies, with assistance from the ICC as requested, as it should be. This local level option would be forfeited if the January 31, 1980 deadline is not met.

To assist in accomplishing the responsibilities specified in HB911, the ICC is directed in Section 9 to consult with certain state agencies and the telephone companies:

> "...the Commission is directed to consult at regular intervals with the State Fire Marshal, the Department of Public Health, the Department of Transportation, the public utilities in this State providing telephone service, the Department of Law Enforcement, and the State Division of Forestry."

The ICC is complying with this section of the law by having formed a 911 Advisory Committee composed not only of representatives from the above named agencies, but also representatives of many other agencies and professional associations in the state as well. This Committee has been meeting on a regular basis--approximately every two months since July 1975. To maintain compliance with this section of the law, the 911 Advisory Committee, either as presently constituted or at least with the members of the agencies specified in Section 9, should continue to meet at regular intervals for an indeterminant period of time. This Committee would be useful even if it were not required by the law. It is needed to provide a continuous forum to enable representatives of all the stakeholder groups to input their recommendations to the ICC.

The amount and exact type of aid that the ICC should give to local agencies and officials is not completely clear. Following is what is ordered by Section 8 of HB911:

> "The Commission...shall assist local public agencies and local public safety agencies in obtaining financial

help to establish emergency telephone service, and shall aid such agencies in the formulation of concepts, methods, and procedures which will improve the operation of systems required by this act and which will increase cooperation between public safety agencies."

This section directs the ICC to assist local agencies in obtaining financial help to implement 911. The following question immediately comes to mind. Must the ICC's assistance result in the obtaining of financial help by the local agencies, or does it mean that the ICC is to make as many finance alternatives as possible known to the local agencies? We believe that the second part of the question applies--the ICC must provide information on potential sources of funding for 911 systems. Section 8 does not guarantee that the ICC will find money for the local agencies. Failure on the part of the ICC to find financial assistance for local agencies does not remove the local obligation, under HB911, to implement 911 service. Finance alternatives and concepts are presented and discussed in some detail in Section VI of this report.

The second part of the above quote from Section 8 of HB911 specifies that the ICC is to aid local agencies in the formulation of 911 system concepts, methods, and procedures. This directive is extremely important both in terms of its impact on planning at the local level, and in terms of its impact on the ICC's staffing requirements.

The ICC has already begun to comply with this part of Section 8. The several meetings of the 911 Advisory Committee, together with the regional meetings that were held in December of 1975, have contributed a good deal to increasing the awareness and understanding of the 911 concept and HB911 by local public agencies and local public safety agencies. The next significant assistance that will be provided by the ICC will be this report and the two planning manuals--telephone and local government--resulting from our statewide study. The information contained in these documents provides substantial aid to local agencies.

No matter how clearly and in what detail we present the results of our study effort, there will still be a great many questions on the part of local officials that will have to be answered. To satisfy this local need, it is absolutely necessary that the ICC's Telephone Section immediately have at least three or four staff members that are dedicated to the 911 program and are available to visit areas of the state at the request of local 911 planning committees. These staff members will serve multiple functions, such as the following:

- Advise local agencies about the implications of various alternatives.

- Mediate boundary disputes between adjoining jurisdictions or agencies.

- Initiate the planning process in areas where it does not occur as the result of local initiative.

- Interpret the Local Government and Telephone Planning Manuals, if necessary.

This is not intended to be an exhaustive list, but merely to show some of the roles the ICC will play during the planning process. In the longer term, four or five 911 program staff members will probably be needed by the ICC to ensure complete, successful implementation of 911 by 1985 on a statewide basis. After statewide implementation is completed, perhaps only two or three staff members will be required to keep the program running smoothly.

California and Florida each have dedicated staff to answer questions and to attend local 911 planning meetings. This method has proven to be extremely valuable. These local visits have not only provided assistance to local agencies, but they have also increased the state awareness of the local problems associated with the implementation of 911 service. This increased state awareness can lead to modifications in state 911 policy to benefit local 911 systems. Considering the large size of Illinois and the diverse character and emergency communication requirements of the probable 911 systems, this feedback mechanism would be very useful.

During the local planning process there will probably be a number of instances where there are disputes among local government entities as to the boundary, technical characteristics, operational methods, management forms, or method of finance of a proposed 911 system. If the local agencies involved are not able to resolve their differences among themselves in a timely fashion, it then becomes the responsibility of the ICC to see that the differences are resolved. This is especially true in terms of meeting any of the deadlines specified in HB911.

The most probable, and perhaps most equitable, form for ICC involvement in settling local 911 planning disputes would be a two stage approach. First, an ICC staff member would conduct one or more meetings with the parties that are involved, to clarify the situation and explain available options and alternatives. Hopefully, interested parties would

settle their differences without the need of proceeding to stage two. The second stage would consist of a formal hearing before the full Commission, resulting in a decision by the Commission. The courts, of course, would settle the matter in the event that one of the interested parties refused to accept the decision and brought suit against the ICC.

If a local dispute involves compliance with HB911, then the ICC itself may begin judicial proceedings to enforce compliance. The following two passages from HB911 make this quite clear.

Section 7 states:

> "...the Commission, with the advice and assistance of the Attorney General, shall secure compliance by public agencies as provided in this Act."

Section 12 states:

> "The Attorney General may, in behalf of the Commission or on his own initiative, commence judicial proceedings to enforce compliance by any public agency or public utility providing telephone service with this Act."

Another major preimplementation responsibility of the ICC, as directed by Section 10 of HB911, is to establish the technical and operational standards that will govern the implementation and operation of 911 systems in Illinois:

> "Technical and operation standards for the development of the local agency systems shall be established and reviewed by the Commission on or before December 31, 1979, after consultation with all agencies specified in Section 9."

One of the outputs of our study is a recommended set of these standards--applicable both to the local agencies and to the telephone companies. Proposed standards are presented in the Local Government Planning Manual. We recommend that the system standards be legally finalized by 31 December 1976. Waiting until the deadline of 1979 would probably cause a great deal of confusion and would be detrimental to the 911 program.

In Section 11 of HB911, the ICC has been given the authority to accept or reject the final 911 system plans that are submitted by public agencies:

"...the Commission shall have the power to approve or disapprove such [final] plan, unless such plan was announced before the effective date of this Act."

ICC staff will carefully review all tentative and final plans to ensure compliance with minimum 911 system standards and to make certain that there is no potential conflict between adjacent 911 systems. In the event that final plans for any 911 systems are submitted prior to the formal adoption of statewide system standards, the ICC should grant approval subject to change, depending on the finalized form of the standards.

Systems that are now in operation or system plans that were announced (The ICC will have to define what is meant by "announced") prior to July 1, 1975 (the effective date of HB911) do not have to submit tentative or final plans. However, the public agencies operating these systems are required by Section 11 of HB911 to submit a report describing the system and stating its operational date. Even though these "grandfathered" systems are exempted from filing plans, they must eventually conform to the minimum 911 system standards.

Coordinating implementation of 911 systems is an ICC responsibility (specified in Section 8 of HB911) that will require ICC staff to develop and maintain detailed and up-to-date files describing both existing and planned 911 systems. The development of these files should begin as soon as possible, with the limited ICC staff resources that are now available.

2. Postimplementation Role

After 911 is implemented, the ICC will interact with local agencies in three major ways:

- Make certain that all 911 systems are complying with the minimum standards.
- Approve or disapprove of any requested changes or modifications to an existing 911 system.
- Resolve any 911 system disputes that arise between local agencies.

The ICC will have to devise procedures with appropriate documentation, by which periodic checks can be made to ensure that all technical and operational standards are maintained by all 911 systems in Illinois. This should not present too much of a problem except in the

heavily populated areas and those areas that are undergoing a rapid increase in population. The ICC will probably receive much of its information regarding noncompliance with standards by way of system performance monitoring and complaints filed by 911 system participants.

As time passes, it might be either necessary or desirable to change or modify in some way some of the 911 systems. To accomplish this it will be necessary for the participating local agencies to file a formal request with the ICC stating the change or modification that is desired, together with the appropriate reasons. The ICC has the authority and responsibility to approve or disapprove such a request.

Disputes will undoubtedly occur between 911 system participants even after system implementation has taken place. When these difficulties arise, the ICC will have to settle them in some manner. The most logical way would be to employ the same method used in settling the preimplementation differences--a formal Commission hearing.

3. Statewide Role

The ICC must submit certain reports and recommendations to various state officials at specified times. These activities should present a statewide view of 911 to the state's government.

Section 13 of HB911 orders the ICC to "report to the General Assembly the progress in the implementation of systems required by this Act." The ICC is required to make two such reports--one in February of 1979 and one in February of 1981. Section 13 states further that these two reports shall contain the ICC's recommendations for additional legislation.

Section 13 also directs each telephone company to file a report by 1 March 1979, and every even-numbered year thereafter, describing the extent to which 911 service has been implemented and the projected implementation plans. The ICC will specify the exact type of information that is required and the format in which it is to be filed.

Any legislative recommendations that the ICC might make will be the result, primarily, of the feedback obtained from ICC staff involved at the local level and from meetings of the 911 Advisory Committee.

The following is another directive contained in Section 13 of HB911:

> "In December of 1979 and in December of 1980 the Commission...shall submit recommendations to the Bureau of the Budget and to the Governor specifying amounts necessary to further implement the organization of telephone systems specified in this Act during the succeeding fiscal year. The report specified in this paragraph shall contain, in addition, an estimate of the fiscal impact to local public agencies which will be caused by implementation of this Act."

The implications of the first sentence of this quote were discussed in the Finance section of this report. The second sentence directs the ICC to make an estimate of the additional cost incurred by local public agencies in implementing 911 service to comply with the provisions of HB911. These estimates will be generated during their interaction with local planning units.

This statewide role of the ICC is very important. The various reports and recommendations of the ICC will have a lasting impact on the success of the 911 program in Illinois.

B. ICC Staff Requirements

To efficiently and effectively carry out its additional responsibilities, as created by HB911, the ICC must hire additional personnel to form a group of people that are dedicated to the statewide 911 program. The 911 program will require at least four or five additional people to augment the Chief Telephone Engineer's very small staff.

At least three or four of these staff members will be required to perform the essential function of 911 field representatives to enable the ICC, as directed by the law, to provide aid and assistance at the local level. These same persons will be required to collect and analyze the information that will be necessary to formulate all of the previously discussed reports and recommendations.

A secretary-file clerk dedicated to the 911 program will be an absolute necessity. There will be a voluminous amount of information collected that will have to be organized and filed. In addition, there will be a great deal of correspondence and other paper work involved.

The 911 program staff members acting as field representatives must obviously be knowledgeable in the field of telephone systems engineering. In addition, they should have, or be able to obtain in a relatively short

time, a basic knowledge and understanding of the operational characteristics and problems of the various types of public safety agencies. The public safety knowledge is essential because most of the problems associated with 911 are of a non-technical nature.

An excellent mechanism for gaining a fundamental knowledge of public safety communications operations is to spend time in public safety radio dispatch centers observing what takes place. It is also quite useful to ride in public safety emergency vehicles to get a feel for the communications needs and problems of mobile units. Perhaps the 911 Advisory Committee can suggest additional ways of increasing the ICC staff's understanding of public safety communications.

To maintain a continuous awareness of what is happening in the field of public safety communications, we recommend that one of the ICC's 911 program staff members join both of the following professional organizations--the Associated Public-Safety Communications Officers, Inc. (APCO), and the International Municipal Signal Association, Inc. (IMSA).

If the ICC's budget is not increased to enable it to hire the necessary additional staff and provide for their expenses, we believe that the state's 911 program will be put in serious jeopardy. It appears that the burden that 911 is already placing on the current staff is nearly intolerable. If the Chief Telephone Engineer's current staff continues its present high level of involvement--an involvement that will have to increase--with the 911 program, other responsibilities of the ICC's Telephone Section will have to be de-emphasized, to the detriment of the state.

Until such time as additional personnel are hired to adequately staff the 911 program, the ICC should give serious consideration to obtaining further assistance and guidance from an outside consultant firm.

IX RELATED PROBLEM AREAS

Because 911 system development requires unusual and extensive interagency and interjurisdictional interactions, it generally brings a number of issues to the surface that are related to 911 implementation, but well beyond the scope of a conceptual 911 study. In our development of 911 system concepts for Illinois, a number of such issues have been identified. In this section, we will briefly discuss jurisdictional ambiguity, personnel development, and considerations for provision of a special secondary three-digit number.

A. Jurisdictional Ambiguity

Each 911 system is to provide access to local police, fire and emergency medical resources. Potential problems are created if there is more than one agency of a particular type in a 911 service area or if there is no agency of a particular type in a 911 service area. Three such problems were identified in this study.

1. State Police/Sheriff Service Areas

The Illinois State Police (ISP) provide law enforcement services throughout the state. In some of the more rural areas of the state, their resources may equal or exceed those of the local sheriffs. An important question in 911 planning is, then, how to integrate the resources of the ISP into 911 systems.

In the Local Government Planning Manual, we included alternatives that encompassed ISP regional areas. Additionally, it is essential that ISP personnel be represented on local 911 committees. Effort must be directed toward defining both state and local policies about use of ISP resources (vehicles) by PSAPs. For example, an incident is reported to a PSAP which can be handled by either the ISP or the local sheriff. Does the 911 call answerer: contact both agencies? contact the agency with the closest unit? or use an agency rotation algorithm? While this sort of problem may not be prevalent in all areas, it will appear in many jurisdictions.

Problems unique to 911 are only part of the larger problem of making the most effective use of ISP resources in state law enforcement. We recommend that the state initiate a study to maximize effective use of ISP resources, with emphasis on the potential of 911 to improve resource allocation in general.

2. Ambulance Resource Utilization

Unlike law enforcement and fire protection, private ambulance resources are seldom confined to specific service areas. In urban and suburban areas, several ambulance companies may serve common areas on a competitive basis; while, in rural communities, ambulance service may be very scarce. Private ambulance companies provide all ambulance service in some areas; whereas, in the other areas, they may share ambulance service with municipal and/or volunteer ambulance agencies.

The creation of 911 systems in Illinois provides the state and local communities with a unique opportunity to increase effective use of ambulance resources. Each local 911 committee must adopt policies and call handling procedures that fairly and effectively use the local ambulance resources. Additionally, the provision of inter-911 center communications provides the local communities with an effective means of using the adjacent areas' ambulance resources in major emergency situations.

The Local Government 911 Planning Manual suggests that all local emergency medical (EM) facilities be included in the planning process. This inclusion will point to a number of critical questions, for example:

- What policy shall the PSAP use to select an ambulance company from among several that service a common area?
- What policy shall the PSAP use to select an ambulance company to make particularly long runs?
- Should the PSAP have fiscal responsibility for ambulance runs that result in no pick up or in a patient unable to pay for a pick up?
- Can a PSAP discourage competitive runs to an emergency scene when the PSAP has not directed that run?
- Can the PSAP provide direct dispatch of ambulances on the 155.220 MHz medical channel?

- In view of the nonjurisdictional characteristics of ambulance services, especially in rural areas, should or can a 911 committee encourage zoning of it service area in order to provide effective ambulance service for all citizens?

- How will the cost of direct dispatch of private ambulance resources be billed to the private ambulance companies?

These questions are well outside the scope of this study since their answers involve an assessment of the total use of Illinois emergency medical resources, not just their inclusion in 911 systems.

The Illinois Department of Public Health and related agencies have been vigorously attacking the problems of EM service delivery. The impending development of interjurisdictional 911 systems will, however, accelerate the need for answers to the above questions. Consequently, we recommend that the state immediately address these points so that consistent and effective handling of EM resources will emerge from the local 911 system planning process.

3. Fire Protection

There are some areas of Illinois that are not protected by fire districts. The state legislature, with PA 79-1054, has recognized this problem, and directed the state Fire Marshall to facilitate the inclusion of these unprotected areas in adjacent or new fire districts.

As 911 systems are developed, the 911 committees must determine their fire protection situation. If there are areas where no fire protection is provided, the committees should coordinate with the Fire Marshall to determine policy for these areas.

Until statewide fire coverage is achieved, the 911 systems will have to adopt fire protection policies that best match the needs of their local areas, pending further state action (see Section 14 of HB911). In the current situation, some 911 centers will not be able to provide fire protection to parts of their service area, so we recommend that the state further study this problem and adopt a specific policy in this area.

B. Personnel Development

Personnel manning the PSAPs will be unique in many ways. They must be able to receive emergency calls for police, fire, and medical services. In many cases they must dispatch the vehicles as well. They will frequently be employed under fairly unique multijurisdictional and multiagency management. These personnel must be adequately trained in an ICC-approved curriculum and their rights as employees protected if the 911 systems are to be fully effective.

In Appendix A, we discuss a training program for 911 call answerers and managers. The ISP is planning to develop this program which will be available to all future 911 personnel. One major problem will be local access to this program, and the state should develop a policy to assist local areas in this matter. That is, some provision to make such a program available locally is necessary. This program should provide training in: 911 answering, dispatch of emergency vehicles, and resource allocation (if necessary). If a center requires a manger (because of its size), the state should provide (preferably free) the training described above plus instruction on how to interact with policy and operational boards and to manage personnel under joint powers or contract agreements.

Because personnel in a multijurisdictional PSAP will be operating in a fairly unique organization, it is important that their rights and benefits as employees are not abridged. These personnel will still be municipal employees, but they will be employed (in a PSAP) by a number of municipalities rather than one. If one employee transfers from his/her current position with a municipality to a PSAP, the state and the local 911 committee must make sure that that employee does not lose any employment rights.

For example, while the state pension plan provides coverage for municipal employees it will have to be liberally interpreted in order to provide coverage for PSAP employees working for multiple jurisdictions. Similarly, such employee rights as seniority, health plans, vacation, sick leave, etc. should be equitably provided when employees transfer to PSAP employment.

Because these problems are involved with state and local personnel policy, we recommend that the ICC study them and recommend future policy action for training and for protection of employees' rights.

C. Considerations for Provision of a Special Secondary Three-Digit Number

The question is often asked by fire and emergency medical agencies: "Why can't we have our own three-digit emergency telephone number? Let the police have 911 for their number."

First of all, the basic purpose and principle of a universal emergency number is defeated by this proposition. The major intent of 911 implementation is to provide one simple, nationwide emergency number to give the public direct access to an emergency call answering center. If partially implemented, the effect on the public of another special emergency number would be to cause inconvenience and confusion to those away from their home communities.

It is technically possible, in most areas, for the telephone company to provide an abbreviated emergency number in addition to 911. However, the agency(s) that such a number would serve would be required to pay all costs associated with the implementation of such a number.

If a special emergency number (in addition to 911) were introduced, the following cost penalties and shortcomings would either be included in direct charges for the system or be passed along to all telephone subscribers by way of increased telephone service tariffs.

There would be a cost associated with making available and restricting the use for other purposes of another special number (code). The limited combinations of a given number of digits places a value on codes for the telephone industry. Under the existing nationwide numbering plan, the exhaustion of available three-digit Numbering Plan Area (NPA) codes, as well as prefix codes in a given NPA, results in extremely costly measures to rearrange the dialing patterns.

In addition to the inherent cost of setting aside a code, there are the extensive rearrangement costs which would be necessary to clear out a particular code in order to make it universally available if it is currently being utilized. One or two digit codes are even more costly, since without special timing apparatus to determine whether additional numbers are forthcoming before switching the call they would render entire groups of three digit codes inoperative.

Utilization of a four-digit code presents the same problem pertaining to universality as the three-digit code. While a prefix code is not totally consumed by this option, 1000 telephone numbers in the prefix become unassignable. The four-digit number is less convenient and commitable to memory. A certain number of dialing errors committed by parties calling other numbers in the prefix would be inevitable. A 911-X (X being any digit from 0 to 9) would avoid prefix conflict problems, but would require a costly timing apparatus to distinguish from 911 calls.

The special symbols (* and #) on a 12-button telephone set using a push-button multifrequency dial have been designated to be used for special signalling functions. These include Picturephone® signalling, indicating end of digits dialed for international calls, and communications with computers (banks, credit card agencies, etc.). Since dial phones and 10-digit Touch-Tone® phones are not equipped to send these signals, the universal use of any code including these symbols would be prohibited.

Any code which is a portion of another code or number would require costly timing apparatus. If a switching machine is to receive some codes which are portions of other codes switched by the machine, the practical way to distinguish between them is to measure a reasonable time interval after the shorter code to determine whether to treat the abbreviated code or wait for more information.

Special switching modifications and trunk circuit development may be required for a new special code, such as were required and specially developed for 911. Most Step type of switching offices would require a build-out of additional equipment to process a new code. Crossbar and electronic offices require an update in the common control mechanism to recognize the special code.

Trunk group inefficiencies due to two networks would add to overall costs. A number in addition to 911 would mean splitting one trunk group for 911 into two. The total number of trunks required to provide the same grade of service to two systems would consequently increase. This is due to trunk efficiency increasing as the size increases and vice versa. The number of trunks for small systems might double since the second system would also require a minimum size trunk group.

Selective call routing expense would effectively be doubled by two numbers--based on current developments. The current concept of this method of dealing with non-coincident boundaries implies that an additional number to 911 would require twice the equipment and software to implement as well as increased clerical and work procedures to update the data base for every telephone number change or address change within the 911 serving area.

Depending on the particular 911 arrangement, special transfer circuits at the 911 console and the special number console may be necessary due to dialing errors, confusion between numbers, etc. that result in getting to the wrong console. Call answerer work time for handling calls at the special number answer point location would probably be increased with the necessary additional cross transferring of calls, as well as the critical delay involved.

Provision of various special features may require redundant systems and/or special interconnections to transfer data. These features include Forced Disconnect, Idle Circuit Tone Application, Called Party Hold, Ringback, ANI, and ALI. Since some of these features are trunk related and billed, a cost penalty due to less efficient trunk groups (more trunks) would also apply for these services.

Finally, the state of Illinois has enacted a law which makes 911 mandatory and specifies that every 911 system shall include police, firefighting, and emergency medical and ambulance services. Therefore, establishing another special number for a specific type of public safety agency seems contrary to the purposes of the law.

D. Summary

The problems discussed in this section are only some of the many that will undoubtedly be identified as 911 system implementation occurs. As discussed earlier, it is mandatory that the ICC have adequate staff to address these problems and adequate resources to obtain further contractor assistance if it is needed.

X PROGRAM FOR 911 IMPLEMENTATION

In this chapter, we present a brief summary of the major steps to be taken by Illinois state and local organizations. These steps are discussed in either the plar .ng manuals or in this report; this chapter is meant to serve only as a summary of what needs to be done if 911 is to be a successful program.

A. State Responsibilites

In mandating statewide 911 service for its citizens, the state of Illinois has assumed certain responsibilities for future actions. That is, without further state action, 911 may not be implemented throughout the state. The necessary state actions fall into three rough categories that are discussed below.

1. State Subvention

The state legislature must make a decision as to the amount and nature of any state 911 subvention as quickly as possible. If this is not done, the local agencies will be planning in an unknown fiscal environment and will have difficulty in selecting cost-effective 911 alternatives. Additionally, many areas will be extremely reluctant to act upon the legislation, and local resistance to the program will be strong.

The state could force the issue through the courts, but this could be a lengthy and expensive process which would not necessarily produce the desired result. On the other hand, if the state develops a fiscal program which provides some fiscal assistance to local governments, local resistance will be substantially reduced. With state fiscal support, it is our opinion that 911 planning and implementation will be accomplished with greater speed and dispatch. This is particularly true in those areas which are at the limit of their fiscal resources and would be hard pressed to develop a new progfam such as 911.

2. 911 System Standards

Since the state has mandated that all 911 systems meet state-developed standards, these standards should be finalized as soon as possible. Otherwise, the 911 planning process will be delayed while local committees wait to develop the technical and operational components of the 911 plan. In particular, these standards should be finalized by the end of calendar 1976, well prior to the legislated date of 1979. This earlier date will permit local 911 plan development to be staggered over the next three to four years rather than concentrated in one year. This will reduce the probability that the ICC will be swamped with preliminary plans in 1980, and allow for a more natural development.

3. Augment ICC Capability

The ICC is currently responsible for:

- Developing technical and operational 911 standards
- Providing local governments with assistance in interpreting HB911 and the planning manuals
- Arbitrating any local disputes about 911 development
- Initiating 911 planning in areas which do not begin of their own accord
- Analysing all preliminary and final 911 plans
- Reporting to Legislature on costs and status of 911 systems.

To accomplish these multiple tasks, it is very important that the ICC have both the staff and fiscal resources described in the report. If such assistance is not provided, either the 911 program or traditional activities will suffer, as the existing staff cannot hope to perform all of the required tasks. We recommend that at least two new staff persons be hired immediately, to be followed by one to three more as the workload increases.

B. Local Responsibilities

Local governments also have certain responsibilities as a result of HB911. Although the ICC will assist with 911 planning and development, the major responsibility for successful planning will rest at the local level. This is inevitable, since local governments and agencies will have to "live with" resulting 911 configurations. In the Local Government 911 Planning Manual and the Illinois 911 Telephone Planning Manual, steps are outlined by which 911 planning committees can achieve orderly and effective implementation of 911 systems. These following planning steps are recommended:

- Form regional 911 committees and interface with the ICC.
- Evaluate local public safety communication systems, telephone company situations, and interagency/interjurisdictional agreements.
- Evaluate 911 call handling techniques and standards for 911 systems and discuss their relative merits for each agency.
- Study and/or develop local alternative 911 configurations and PSAP locations.
- Select a management form for each alternative.
- Considering costs vs benefits, select the 911 alternative most suited to the local area.
- Prepare preliminary 911 plans to be sent to the ICC.

Local governments and agencies are responsible for: reading and following these two manuals, cooperating with surrounding areas to develop viable alternatives, and developing county by county 911 plans.

C. Conclusion

The state and local governments of Illinois are in an excellent position to achieve statewide 911 for all their citizens. We believe that this report and the planning manuals provide sufficient state and local guidance to achieve this goal.

Appendix A

ANCILLARY 911 REQUIREMENTS

Appendix A

ANCILLARY 911 REQUIREMENTS

A. Selection and Training of 911 Personnel

One of the most important factors in operationalizing 911 will be the adequacy of the training given 911 personnel, both management and call answerer/dispatchers. After each committee has gone through the 911 planning process, it will have a good idea about the sorts of backgrounds that 911 personnel should have. Consequently, it will be able to develop criteria for designating personnel for 911 training with little delay. In most situations, selecting personnel will be simplified because existing communications personnel probably will be manning the 911 systems.

The same situation applies to the management staff; it is likely that most areas will choose to locate 911 in an existing communications center; consequently they will not have to specifically hire a manager unless it is necessary for political reasons. However, since there are so few individuals with actual management experience in multiagency 911 systems, at least one member of each PSAP (or one local public safety director) should be trained in 911 system management before 911 service is implemented. Since most of the potential 911 management personnel will have worked for a specific agency, additional training will be necessary so that they can provide adequate service to a range of agencies and jurisdictions.

This training program falls logically into two categories: those elements which are common across the state and those elements which are specific to each local area. We recommend that the state develop and provide a training program to cover the first grouping while the local governments develop a program for their own area. Essential topics which should be covered in these training programs are presented in Table A-1.

The preceding table is not intended to be an exhaustive listing, but rather an idea of the minimal training 911 personnel should receive. Since 911 will be a new service, its employees must have the appropriate orientation before the system is operationalized in order to minimize problems and increase the satisfaction of participants and citizens alike. Both programs should be based on written materials which can be referred to in dubious situations so that the individual who has completed both training elements will have a complete printed record of his classes.

B. Advertising 911

The question of when to begin advertising the 911 system has been much debated. On the basis of national experience, we feel that the following sequence is the most appropriate. The change to 911 should be

911 Management		911 Operating Staff	
State Training	Local Training	State Training	Local Training
Legal history of 911, HB911 State developed standards Responsibility to all served agencies Discussion of 911 problems Discussion of state and federal resources -- MERCI, ISP, LEADS, etc. Discussion of differences in police, fire, and EM emergencies. Policy implications of differences. Management under joint powers and contract agreements	Local resources, in own and adjacent areas Access to special services such as FBI, poison control, suicide prevention Specific call handling policy for all served agencies Call handling algorithms for ambulance resources; including private, if applicable Billing or other cost accounting for member agencies Local standards if over and above state standards	Legal history of 911, HB911 Importance of the 911 call answerer Professional conduct in crises Responsibility to all agencies and public Different response requirements by service and by agency Effective telephone techniques Information which must be acquired and how it is used for dispatch purposes Technical and operational terminology Dispatch techniques for multiple agencies	Specific procedures for each user agency Criteria for 'emergency' for each agency Specific procedures for call handling in ambiguous jurisdictional cases Service area of each served agency Specific local dispatch policy for each agency Automatic and mutual response agreements Local standards over and above state standards

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Table A-1 TRAINING FOR 911 MANAGEMENT AND OPERATING STAFF

advertised locally approximately one week before the actual start of 911 operation and two weeks before the announced start, e.g., the actual start should predate the advertised change and postdate the advertising campaign. This gives a period during which the system can be tested but will not be liable. Enough citizens will call 911 to adequately test the system, but it will not be operating at capacity. Above all, advertising must not begin too far in advance, because citizens will begin to use the number soon after its eventual implementation is announced. If too many citizens are disappointed, public pressure for earlier implementation may result.

Advertisements should appear in local papers--preferably on the front pages--be broadcast over the local radio, and posted in public buildings. Advertisements should detail the area to be served, the agencies involved, and the date when the system will be operational. In addition, emergency functions of 911 should be stressed from the first in order to reduce the volume of administrative calls. It would probably be helpful if the advertisements stated that administrative calls would be referred to the administrative seven-digit numbers. The advertisements should also explain the improvements 911 will make in service and access of public safety agencies. Emphasis should be placed on the role played by local agencies and jurisdictions in developing this improved situation.

Appendix B

HB 911

AN ACT in relation to the designation of an emergency telephone number for use throughout the State.

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

Section 1. The General Assembly finds and declares that it is in the public interest to shorten the time required for a citizen to request and receive emergency aid. There currently exist thousands of different emergency phone numbers throughout the state, and present telephone exchange boundaries and central office service areas do not necessarily correspond to public safety and political boundaries. Provision of a single, primary three-digit emergency number through which emergency services can be quickly and efficiently obtained would provide a significant contribution to law enforcement and other public service efforts by making it less difficult to quickly notify public safety personnel. Such a simplified means of procuring emergency services will result in the saving of life, a reduction in the destruction of property, quicker apprehension of criminals, and ultimately the saving of money. The General Assembly further finds and declares that the establishment of a uniform, statewide emergency number is a matter of statewide concern and interest to all inhabitants and citizens of this State. It is the purpose of this Act to establish the number "911" as the primary emergency telephone number for use in this State and to encourage units of local government and combinations of such units to develop and improve emergency communication procedures and facilities in such a manner as to be able to quickly respond to any person calling the telephone number "911" seeking police, fire, medical, rescue, and other emergency services.

Section 2. As used in this Act, the terms defined in Sections 2.01 through 2.09 have the meanings ascribed to them

Clerk of the House

Adopted in the House of Representatives

PUBLIC ACT 79-1082

in those Sections.

Section 2.01. "Public agency" means the State, and any unit of local government or special purpose district located in whole or in part within this State which provides or has authority to provide firefighting, police, ambulance, medical, or other emergency services.

Section 2.02. "Public safety agency" means a functional division of a public agency which provides firefighting, police, medical, or other emergency services.

Section 2.03. "Direct dispatch method" means a telephone service providing for the dispatch of an appropriate emergency service unit upon receipt of a telephone request for such services and a decision as to the proper action to be taken.

Section 2.04. "Relay method" means a telephone service whereby pertinent information is noted by the recipient of a telephone request for emergency services, and is relayed to appropriate public safety agencies or other providers of emergency services for dispatch of an emergency service unit.

Section 2.05. "Transfer method" means a telephone service which receives telephone requests for emergency services and directly transfers such requests to an appropriate public safety agency or other provider of emergency services.

Section 2.06. "Referral method" means a telephone service which, upon the receipt of a telephone request for emergency services, provides the requesting party with the telephone number of the appropriate public safety agency or other provider of emergency services.

Section 2.07. "Basic system" means a telephone service which automatically connects a person dialing the digits "911" to an established public safety answering point through normal telephone service facilities.

Section 2.08. "Sophisticated system" means a basic system with the additional capability of automatic

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identification of the caller's number, holding the incoming call, reconnection on the same telephone line, clearing a telephone line, or automatic call routing or combinations of such capabilities.

Section 2.09. "Commission" means the Illinois Commerce Commission.

Section 3. Every local public agency, within its respective jurisdiction, shall establish and have in operation by December 31, 1985, a basic or sophisticated system as specified in this Act.

The establishment of such systems shall be centralized to the extent feasible. Nothing in this Act shall be construed to prohibit or discourage in any way the formation of multijurisdictional or regional systems, and any system established pursuant to this Act may include the territory of more than one public agency or may include a segment of the territory of a public agency.

Section 4. Every system shall include police, firefighting, and emergency medical and ambulance services, and may include other emergency services, in the discretion of the affected local public agency, such as poison control services, suicide prevention services, and civil defense services. The system may incorporate private ambulance service. In those areas in which a public safety agency of the state provides such emergency services, the system shall include such public safety agencies.

Section 5. The digits "911" shall be the primary emergency telephone number within the system, but a public agency or public safety agency may maintain a separate secondary backup number, and shall maintain a separate number for nonemergency telephone calls.

Section 6. All systems shall be designed to meet the specific requirements of each community and public agency served by the system. Every system, whether basic or sophisticated, shall be designed to have the capability of

utilizing at least 1 of the methods specified in Sections 2.03 through 2.06, in response to emergency calls. The General Assembly finds and declares that the most critical aspect of the design of any system is the procedure established for handling a telephone request for emergency services.

In addition, to maximize efficiency and utilization of the system, all pay telephones within each system shall, by December 31, 1985, enable a caller to dial "911" for emergency services without the necessity of inserting a coin.

Section 7. The General Assembly finds that, because of overlapping jurisdiction of public agencies, public safety agencies and telephone service areas, the Commission shall establish a general overview or plan to effectuate the purposes of this Act within the time frame provided in this Act. In order to insure that proper preparation and implementation of emergency telephone systems are accomplished by all public agencies by December 31, 1985, the Commission, with the advice and assistance of the Attorney General, shall secure compliance by public agencies as provided in this Act.

Section 8. The Commission, with the advice and assistance of the Attorney General, shall coordinate the implementation of systems established under this Act. The Commission, with the advice and assistance of the Attorney General, shall assist local public agencies and local public safety agencies in obtaining financial help to establish emergency telephone service, and shall aid such agencies in the formulation of concepts, methods, and procedures which will improve the operation of systems required by this Act and which will increase cooperation between public safety agencies.

Section 9. To accomplish the responsibilities specified in this Act, the Commission is directed to consult at regular intervals with the State Fire Marshal, the Department of

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Public Health, the Department of Transportation, the public utilities in this State providing telephone service, the Department of Law Enforcement, and the State Division of Forestry. Such agencies shall provide all necessary assistance and consultation to the Commission to enable it to perform its duties specified in this Act.

Section 10. Technical and operational standards for the development of the local agency system shall be established and reviewed by the Commission on or before December 31, 1979, after consultation with all agencies specified in Section 9.

Section 11. On or before January 31, 1980, all public agencies shall submit tentative plans of the establishment of a system required by this Act to the public utility or utilities providing public telephone service within the respective jurisdiction of each public agency. A copy of each such plan shall be filed with the Commission.

On or before January 31, 1982, all public agencies shall submit final plans for the establishment of the system to such utilities, and shall make arrangements with such utilities for the implementation of the planned emergency telephone system no later than December 31, 1985. A copy of the plan required by this subdivision shall be filed with the Commission. In order to secure compliance with the standards promulgated under Section 10, the Commission shall have the power to approve or disapprove such plan, unless such plan was announced before the effective date of this Act.

If any public agency has implemented or is a part of a system required by this Act on a deadline specified in this Section, such public agency shall submit in lieu of the tentative or final plan a report describing the system and stating its operational date.

Plans filed under this Section shall conform to minimum standards established pursuant to Section 10.

Section 12. The Attorney General may, in behalf of the

Commission or on his own initiative, commence judicial proceedings to enforce compliance by any public agency or public utility providing telephone service with this Act.

Section 13. On or before February 16, 1979, and again on or before February 16, 1981, the Commission shall report to the General Assembly the progress in the implementation of systems required by this Act. Such reports shall contain his recommendations for additional legislation.

In December of 1979 and in December of 1980 the Commission, with the advice and assistance of the Attorney General, shall submit recommendations to the Bureau of the Budget and to the Governor specifying amounts necessary to further implement the organization of telephone systems specified in this Act during the succeeding fiscal year. The report specified in this paragraph shall contain, in addition, an estimate of the fiscal impact to local public agencies which will be caused by implementation of this Act.

By March 1 in 1979 and every even-numbered year thereafter, each telephone company shall file a report with the Commission and the General Assembly specifying, in such detail as the Commission has by rule or regulation required, the extent to which it has implemented a planned emergency telephone system and its projected further implementation of such a system.

Section 14. The General Assembly declares that a major purpose in enacting this Act is to eliminate instances in which a responding emergency service refuses to render aid to the requester because the requester is outside of the jurisdictional boundaries of the emergency service. Therefore, in implementing systems under this Act, all public agencies in a single system shall annually enter into a joint powers agreement or any other form of written cooperative agreement which is applicable when need arises on a day-to-day basis. In addition, such agreements shall be entered into between public agencies and public safety

agencies which are part of different systems but whose jurisdictional boundaries are contiguous. The agreements shall provide that, once an emergency unit is dispatched in response to a request through the system, such unit shall render its services to the requesting party without regard to whether the unit is operating outside its normal jurisdictional boundaries.

Section 15. Copies of the annual agreement required by Section 14 shall be filed with the Attorney General and the Commission. Commencing with the year 1987, all such agreements shall be so filed prior to the 31st day of January. The Attorney General shall commence judicial proceedings to enforce compliance with this Section and Section 14, where a public agency or public safety agency has failed to timely enter into such agreement or file copies thereof.

Section 16. This Act takes effect July 1, 1975.

William A Redmond
Speaker, House of Representatives

Clyde D Hartee
President of the Senate

APPROVED

this 25th day of September 75

Appendix C

A PROPOSED STATE-LOCAL SUBVENTION FORMULA FOR 911 COSTS

Appendix C

A PROPOSED STATE-LOCAL SUBVENTION FORMULA FOR 911 COSTS

In this appendix we present and discuss an SRI-developed subvention formula that can be used to generate Illinois subvention schedules for possible state subvention. The formula can be used to generate subvention rates for any area. Its form is the following:

$$S_i = \delta \cdot E \left[\frac{A_i (1 - \alpha P_t / P_i)^2}{\sum_{i=1}^{N} A_i (1 - \alpha P_t / P_i)^2} \right] ,$$

where

$$A_i = \left[\frac{E_i (1 - \gamma W_i / V_t)^2}{\sum_{i=1}^{N} E_i (1 - \gamma W_i / V_t)^2} \right] ;$$

and

$$\sum_{i=1}^{N} A_i = 1 ,$$

where

E = total annual statewide 911 recurring cost

E_i = annual recurring cost for 911 system area i

P_i = population served by 911 system area i

V_i = assessed valuation per capita for 911 system area i

V_T = assessed valuation per capita average for all 911 systems

δ = overall fraction of state subvention on a statewide average

N = number of 911 system areas in state

γ = assessed valuation per capita weighting

α = population weighting.

In this formula a fraction of the total statewide 911 annual cost E, represented as $\delta \cdot E$, is to be apportioned between N 911 systems in Illinois. The amount of funds to be distributed then, is fixed; the formula performs a double weighting to distribute this fixed sum to N 911 system areas. The state can set δ at whatever fraction of the actual costs it wishes to subvent. For example, if the state fixes δ at 0.8, this means that the state will finance 80 percent of the total 911 costs for the systems chosen.

The factor A_i, where all the A_i are less than 1, represents the fractional apportionment based only on assessed valuation per capita. The parameter γ is selected so that for any assessed valuation per capita, V_i, $\gamma V_i/V_t$ is always less than 1. The amount of equalization using this formula is thus limited to the extent that γ can be no larger than $V_t V_i$. For example, if a given system has an assessed valuation per capita V_i that is much less than the average V_t, the system will have a relatively higher A_i compared with the other systems and will receive a higher percentage of 911 costs subvented.

As is shown in the formula, the factor A_i is multiplied by $(1 - \alpha P_t/P_i)^2$, α is the parameter that represents the weight given to population and is correspondingly selected so that $\alpha P_t/P_i$ is always less than 1. This in

turn means that α can be no greater than P_i/P_t, which correspondingly limits the ability of the formula to equalize differences in population size. Again correspondingly, for a given system of large population (i.e., one having a large P_i compared with the statewide population average P_t), the factor $(1 - \alpha P_t/P_i)$ will be large and will result in turn in a larger subvention.

Summarizing then, the formula is such that 911 systems serving large populations with small assessed valuation per capita receive maximum state subvention and systems serving small populations of higher wealth receive minimum state subvention.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1979 O—281-380 (1572)